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A PRELIMINARY REPORT

OF THE

GEOLOGICAL AND AGRICULTURAL SURVEY OF TEXAS,

BY S. B. BUCKLEY.

AUSTIN:
PRINTED AT THE OFFICE OF THE "STATE GAZETTE."
1866.

TO HIS EXCELLENCY, J. W. THROCKMORTON,
GOVERNOR OF TEXAS:

Sir: The following report of what was done by Dr. Francis Moore and myself in the Geological Survey of the State is respectfully submitted to your consideration.

I have the honor to be, with great respect, your ob't serv't,

S. B. BUCKLEY.

The Legislature of Texas, in April, 1861, resolved that the Geological Survey of the State be suspended and that Dr. Moore should prepare a report of what had been done under his supervision in said survey. The death of the Doctor caused me, who had been his assistant and companion in the survey, to write a report. As I was also an assistant of Dr. B. F. Shumard in the Geological Survey, my explorations over the State were more extensive than those of Dr. Moore and all the knowledge thus obtained which promises to have any public value is embodied in the following pages.

Importance of a Geological and Agricultural Survey.

To many it may seem unnecessary to say anything on the utility of Geological Surveys, because they have already been tested and found to be of great practical value by most civilized countries. Indeed, it is impossible to develop the mineral and agricultural resources of a State in an economical manner without such a survey. Every citizen of Texas is more or less interested in having its mineral and agricultural resources made known, in order that a proper estimate may be made of the materials appertaining to the State, their extent and their localities. In regard to valuable minerals, we want to know where they may be found, or where we may not expect to find them. This last item is by no means the least useful part of the knowledge imparted by a Geological Survey, for it will often save useless expenditure of time and money. Individual expenditures in the vain search after gold, silver, copper, lead, or other useful metals, to which may be added coal, are public as well as private losses; because the entire wealth of the State chiefly consists in the sum total of its individual wealth; hence what individuals lose is so much subtracted from the whole taxable property, which adds to the taxes of the remainder. On the other hand the discovery of gold and silver, or other useful minerals increases the wealth of the State, and also adds to its sum total of individual wealth; hence all are interested in a Geological Survey, as a matter of public economy. The iron mines in Llano county are alone worth to the State more than one hundred times the amount which the Geological Survey has already cost. Before the Geological Survey of the State of New York began, it was truly estimated that more had been spent in the vain search after coal and other minerals in that State, than was sufficient to defray the entire expenses of its survey, which has been in progress during the last twenty years or more. The annual tax now derived from her iron mines and iron works is greater than the cost of the survey, and this is only one of the important benefits which that State has thus obtained. Other mineral resources have been developed; its agriculture has improved; its lands have been improved (not worn out;) so that they have increased in value more than an hundred fold. Not that her Geological Survey has done all this, but it has certainly been a very important agent in making these results. The value of the iron productions of New York for the year ending the first of June 1860, was 22,304 443 dollars. This is at least one-third greater than the value of the entire cotton crop of Texas for the same year. Texas has actually, in a state of nature, greater and better resources in iron and the materials needed in its manufacture than the State of New York. Money is money, whether made in the manufacture of iron, or the raising of cotton. Let Texas do both, and also develop her other resources, and she will soon become the empire State. Every State at the North has had a Geological Survey, or has one now in progress, and every one at the South, with the exception of Louisiana and Florida; yet there is not one State east of the Mississippi river which gives promise of such vast mineral and agricultural resources as Texas; nor is there one which has derived or can derive, so much benefit from a Geological and Agricultural Survey, properly made, as this State. If we turn to Europe we find that Geological Surveys have been made, or are in progress, in all its countries. England has had one in operation during the last twenty-five years; and under her direction a Geological Survey of Canada began many years ago, and is still incompleted. The miner must have the assistance of the Geologist and Chemist to determine the value of his ores. California is no exception to the rule. Before large quantities of gold were found there the Geologist of the United States Exploring Expedition noticed the gold bearing rocks of that State. Its Geological Survey was commenced several years ago when the washing of its sands had, in many places, ceased to be productive, since which a new impetus has been given to the obtaining of its gold by the working of quartz veins from whence most of the gold from that State is now derived. None of the mining companies in the rich mining States among the Rocky Mountains venture to begin work before suitable geological examinations are made. Hence mining, as it is now generally conducted on scientific principles, is much more reliable than it was a few years ago. This result has been brought about by the enormous sums which have been spent by companies, and individuals in fruitless mining operations.

The survey, if properly conducted, will make known the agricultural capacity and adaptation of the soil for particular crops, and disseminate information with regard to the best modes of cultivating the different grains, grasses, cotton, sugar, tobacco, fruits, etc.; for Texas is so extensive that she has a climate and soil suited to a more varied agriculture than any other State east of the Rocky Mountains. Within the last thirty years the great progress and general diffusion of agricultural chemistry in

Great Britain, and also in New York and other Northern States has more than doubled the amount per acre of their agricultural productions, and more than tripled the value of their lands.

The State collection at the Geological Rooms, although damaged to some extent during the war, is still very valuable. There are many duplicate specimens which should finally be distributed among the leading schools of the State. In 1861 we had applications from three different colleges in Texas for specimens to illustrate geology, mineralogy and botany; for it is of little use to teach these studies without the aid of suitable specimens. We think the main collection, should when completed, form the cabinet of the State University. We believe the most effectual, the most speedy and the most economical way of protecting the frontier, is to make known the mineral wealth of Western Texas, when the tide of emigration would be such as to stop the inroads of the Indians.

REPORT.

The Geological Rooms, having been used in the manufacture of percussion caps during the late war, the cabinet was very much injured, the specimens were thrown in heaps, covered with dust, their labels displaced, and many of the most valuable taken away. It has required much time and labor to restore the fragments to a position suitable for exhibition, or for scientific study. This I have been enabled to do, in part from having assisted in collecting a large portion of them. The value of many specimens is much diminished from the loss of the labels which specified the particular localities where they were found. Such can only be named and placed among the group of rocks or fossils to which they naturally belong. This is not intended to be a full report of what has been done in the Geological Field; but it will chiefly embrace matters of practical utility to the people of the State, and most things which merely have a scientific interest will be omitted. In order that all may understand the subject better, the following synopsis of the principal Geological subdivisions is given, omitting such as have not been found, or are not expected to be found in Texas. The names of the periods and epochs for the Paleozoic of America, are the same that have been applied to those rocks by the Geologists of the New York State Survey, which are now adopted by most American Geologists:

AGE OF MAN.			
POST TERTIARY.			
TERTIARY.		Pleiocene, Meiocene, Eocene,	
CRETACEOUS.			
CARBONIFEROUS AGE		Permian, Carboniferous, Sub Carboniferous.	
DEVONIAN AGE.		Chemung, Hamilton.	
SILURIAN AGE.	Upper Silurian.	Niagara.	
	Lower Silurian.	Hudson, Trenton.	
		Potsdam.	Life began.
AZOIC AGE.		Wanting life.	

In Texas, at the bottom of the series, we have the azoic rocks which are mostly supposed to have formed, when life was absent from our globe ; a large portion of the paleozoic, the cretacious of the mesozoic, and the tertiary or the cenozoic period, embracing as far as is now known a greater geological variety than any other State east of the Rocky Mountains.

The true geological position of the different strata of rocks are known from the fossils, or animal and vegetable remains found in them, such as shells, bones, impressions of leaves, etc. Hence the great utility of fossils in the examination of rocks, and the determination of their true geological position. These animal and vegetable remains have been aptly termed the A B C's of geology ; for no one can be a practical geologist unless he knows the characteristic fossils peculiar to each geological epoch.

By a reference to the preceding diagram the reader will see that at the dawn of creation, we first have the Silurian age ; at the base of which, in the Potsdam rocks, are first found vestiges of the existence of life, shells, &c. Next above is the Devonian at the commencement of which new species, and also new genera began to exist in great numbers ; then fish were also quite numerous, hence it is termed the age of fishes. At the close of this age there was a general destruction of all its species of life ; when other species and many new genera were created, and then began the carboniferous age, or the age of plants, when vegetation was in many places so abundant as to be deposited in vast beds, which were afterwards covered with sand and mud, to become by heat and pressure changed into coal. In many lignite beds are branches and sections of trees half charred, and in both bituminous and anthracite coal its vegetable texture can be distinctly recognized by the aid of the microscope ; which joined with many vegetable impressions above and below coal seams, proves its vegetable origin beyond doubt. Next comes the reptilian age which is divided into the Triassic, Jurassic and Cretaceous. Of these the cretaceous has as yet only been found in Texas, where it extends over a wide range of country. To this succeeds the Tertiary, or Mammalian age, where animal life in many of its present forms became prevalent, and a new order of life began ; a large portion of which is continued to the present time. Recent discoveries in Europe show that the human race existed in the Post-tertiary when the mastadon, the mammoth or gigantic elephant, and other extinct species of quadrupeds had an existence. These geological periods inform us that there has been successive periods of creation ; and also that the work has been both gradual and progressive. Whenever the condition of things, on land or in sea, became unsuited to the existence of a species or race of animals it ceased to live, and new species and races adapted to the new order of things were created. The different *species* of shells &c., found in the Silurian rocks, do not occur in those of the Devonian age, nor are any of those in the Devonian seen in the Carboniferous, &c., so with the other geological periods; hence each geological age has fossils peculiar to itself, the study of which unfolds to us the history of the earth and the changes it underwent before man was.

The Azoic are those rocks which lie beneath the oldest fossiliferous strata, which last are in America called the Potsdam series of rocks, so named by the New York geologists from a place in that State where those rocks abound. When these oldest fossiliferous rocks lie in beds horizontal or nearly so upon granite and metemorphic rocks these last being uptilted into nearly vertical strata, it is proof that the granite and metamorphic strata belong to the Azoic. Granite is an igneous rock thrown up from the interior of the earth by forces similar to those by which our modern lavas are ejected. It's peculiar character is owing to its having been cooled under great pressure beneath other strata of rocks, or at the bottom of deep seas. Granite is composed of three minerals, quartz, mica and felspar; when hornblende takes the place of mica, the rock is termed a syenite. The metamorphic are those non-fossiliferous rocks which are more or less stratified, and whose form and composition has been altered by heated granite, or other rocks of igneous origin; hence they are rarely in horizontal strata, but generally inclined, broken, and contorted by the immense power exerted upon them at the time of the upheavel of the granite, and its associated rocks.

The Azoic rocks now known in this State are mostly in Llano and its adjoining counties. There are granites with steatite or soap-stone, immense beds of iron are, and metamorphic rocks, consisting chiefly of slates, mica schist and gneiss with quartz veins. A large portion of Llano county, as its name indicates, presents a nearly level surface, with isolated mountains scattered here and there over the plain. These mountains are mostly of the azoic granite, but rarely entirely so, their upper portions being generally composed of the older paleozoic rocks of the Potsdam period. The granite is mostly coarse, and from the predominence of a reddish felspar in its composition it may properly be termed a red felspathic granite. It often disintegrates easily, and from it most of the soil of the conty has been formed, and also the sands of its rivers and streams. These sands contain mica of a gold color, which has often been considered as partly gold, and much time has been spent in washing the sands of the Llano streams to obtain the precious metal. Gold has rarely if ever been found in the azoic granites, hence it is useless to search for it in sands made by the crumbling to pieces of its rocks. If it be found in such situations it probably came from metamorphic rocks which may have partly formed the alluvial soils of the neighborhood There is also a granite on the northwestern border of the azoic rocks, a few miles northwest from the Enchanted Rock, which has a fine compact hard texture, which renders it excellent for architectural or monumental purposes. We also saw a similar granite in Burnet county. These last granites probably belong to a later period of elevation and are therefore not true azoic rocks. Future geological examinations will settle this question. The metamorphic rocks here are on the outskirts of the granite and are in nearly vertical strata which are more or less broken and contorted. These metamorphic rocks are peculiarly interesting, for they often contain the precious metals, especially gold and silver. The richest deposits of gold generally are found in quartz veins pervading these rocks. Such veins now yield the greater part of the gold obtained in California. Our metamorphic rocks also have quartz veins and extend over quite a large section, a few miles south and southeast from Fort Mason, in Mason county, from which they extend westward into geologically unexplored regions. They are mostly micaceous shales with quartz veins in highly inclined strata. They have a strong resemblance to the gold bearing rocks of some parts of North Carolina and California. At a place about eight miles south of Fort Mason we found a small quantity of gold in the debris of these rocks ; but as our stay was less than an hour, those rocks need another and much more thorough examination. Near the western border of Packsaddle Mountain on the route to Honey creek are dark shales with quartz veins dipping at large angles. They have a compact texture and a striking resemblance in their dip irregular contorted, strata and lithological character to metamorphic shales near the base of the Smoky Mountains in North Carolina. Near Honey creek these shales extend beneath the nearly horizontal layers of the sandstones and limestones of the Potsdam rocks. These shales also resemble some metamorphic shales near Charlotte, in North Carolina, on the eastern slope of the Alleghany Mountains, which shales contain rich gold mines. Our stay here was also very limited, so much so that we did not attempt to ascertain the thickness of these shales, which, judging from appearances, must be several hundred feet. Near their junction with the Potsdam is a vein of dark brown hematite, about two feet thick, which contains about fifty per cent of metalic iron ; but other and much larger beds of iron are in this county, and can be worked with much greater profit than this vein. Many years ago large quantities of ore were excevated here for the purpose of obtaining silver. Trees apparently forty or fifty years old are growing on the embankments made by the miners. The old inhabitants of this section, when they first visited the mine found a large quantity of ore, which is said to have contained a large per cent. of silver, tied up in a sack of rawhide, lying near the excavation. None of these specimens have been preserved that their value might be tested, but even if they were rich in silver it is uncertain whether they were dug out at this particular locality. It is highly important to determine accurately the age of metamorphic rocks, because most of the gold bearing metamorphic series were formed near the close of the carboniferous age.

The largest deposit of iron ore yet known in this county is on Jackson's creek, near a Mr. Epperson's. It is about twelve miles west of the town of Llano ; and from six to eight miles southeast of the Smoothing Iron Mountain. It is an immense and apparently solid mass of iron, of an oblong oval form, surrounded by the azoic granite, having evidently been raised up from below with the latter. It has a length of about eight hundred feet, and a width of about five hundred feet with an elevation of from twenty-five to thirty feet above its visible base. Loose masses of ore, some of which are of several tons weight, lie scattered over the surface of the iron hill and on its outskirts. It is a magnetic iron ore being the magnetite of the mineralogists. It is the same ore which occurs in the celebrated iron mines of Sweden, and also of those in the northeastern part of the State of New York, all of which are noted for the great excellence of their metalic iron. It is the best iron ore known, and yields the largest per cent. of pure iron. It seems to be a true vein, and like all true veins, to have been ejected up from unknown depths below, hence the supply is inexhaustible ; for no true metalic vein has ever been traced downwards to its termination. However, there is evidently enough near the surface for the wants of the present generation. During the late war an attempt was made for its manufacture, and abandoned for want of funds. It was then tested on a large scale and found to yield seventy-five per cent. of metalic iron. This per cent. is equal to that of the best iron ores, and there are very few which give as much. Some of it was at that time made into horse shoes and nails by some blacksmiths, and pronounced by them to be equal to the best Swedish iron. The limestones of the paleozoic, and cretaceous rocks are in the immediate neighborhood from which abundant materials for a flux can easily be obtained. Soap-stones or steatites of which large quantities are in the same county, a few miles distant, are suitable for the construction of furnaces. Charcoal is used, or was, in 1858, for the manufacture of more than half of the iron made in the United States. In Overman's Treatise on Metallurgy the relative value of the different fuels is thus stated: "If a ton of charcoal be worth one dollar, the same weight of anthracite is worth 94 cents; that of soft or bituminous coal from 85 to 90 cents, and that of brown coal 78 cents: The cost of obtaining the ore is comparatively trifling, for it lies already at the surface. It is in a dry, healthy climate, where there would be little or no loss to the workman or manufacturer from sickness or bad weather. Plenty of food for man and beast can be had from German and other farmers in the surrounding country. It is a comparatively level country, with a hard graveley soil, over which are good roads throughout the year, which either pass around or between the scattered hills and mountains. A railroad from the south, by way of Fredericksburg or its immediate vicinity and extending northward to the Fort Belknap bituminous coal beds, can be made with a very moderate grade. It would need few bridges and require no large hills or mountains to be tunneled. The iron needed by Texas to make Railroads, and for other purposes, will afford a good home market for many years. These and many other advantages are such as to insure large profits to the manufacturer. It is very desirable that its manufacture may be soon started, so as to supply iron for Railroads, machinery, for manufactories, agricultural implements, utensils for family use, and iron and steel for blacksmiths, most of which are now brought from a distance at a great expense. Yes, Texas has paid many thousands of dollars for the above things, which were mostly made at the North from ores of an inferior quality, yielding often not more than fifty per cent. of metalic iron; while at the same time she has the greatest abundance of iron ores at home, which will afford at least seventy-five per cent. of the very best iron. These things ought not to be, and we would earnestly call the attention of the Legislature to the great importance of the subject. Let our own iron ores be manufactured and then we will keep a large capital at home, and attract a still larger one from abroad. It is the cheapest and surest way of having Railroads and manufactories. It will not only create a home market for all agricultural productions, but will also increase the value of every description of property, not alone in Western Texas, but throughout the State, by adding to its railroad facilities, and its entire productive wealth. That there is nothing visionary about this is plainly evident from what other

States have done which actually possess less agricultural and mineral resources than Texas. Take for example the State of New York, and we find according to the census report of 1860, that the value of the steam engines and machinery produced there in the year ending June 1st, 1860, was ten millions, four hundred and eighty-four thousand eight hundred and sixty-three dollars, and the value of the productions of her iron founderies in the same year eight millions, two hundred and sixteen thousand one hundred and twenty-four dollars. We give this example, because New York has no coal mines, but derives her coal from the neighboring State of Pennsylvania, neither has New York any deposits of iron, as favorably situated for working as those in Llano county.

A large bed of iron ore of a similar character to the preceding is distant from it about eight miles, in a north-westerly direction. It lies between two granite ridges, and is traversed by veins of quartz in all directions. This deposit will probably prove to be equally as profitable for manufacturing purposes as the one already described. There are some large veins of ore containing a large per cent. of copper, on the Little Llano, about eight miles above its mouth. It resembles the grey oxide of copper, and on exposure to the air becomes more or less coated with a blueish green color. It's composition is mostly iron, and it is very similar to surface indications at the copper mines of Ducktown, in the south-eastern part of Tennessee. It is there termed by the miners "gossan," or the "blossom" of copper. These Ducktown mines have been a source of great wealth to their owners, and it is possible this Llano mine may prove to be equally profitable. There are several veins of a few feet in thickness between gneissoid metamorphic rocks on the borders of the granite. These veins were partly covered with gravel and soil formed by the disintgeration of the granite hills, near the base of which they are situated, so that we did not ascertain their dip or direction satisfactorily. Their Geological position is such as to lead us to expect that mining will here be a lucrative business; still it always should be remembered that mining, even in the richest mineral regions is always uncertain; yet, the great rewards obtained by the few, will always induce many to dig and search for valuable ores. These last also have their reward; golden dreams, bright visions of the future, and air-castles, are to them sources of happiness.

On Comanche Creek, near Comanche Mountain, are extensive dykes of hornblende rock, enclosing large masses of soap-stone or steatite. One of these veins of steatite is about three hundred feet wide, extending in a westerly direction, towards the Hondo creek, where, at the distance of eight miles, it appears again. It has a bright grey color, a fine grain and a very compact texture, yet so soft as easily to be cut with a knife or sawed into thin boards. It is an excellent material for the construction of furnaces, fire-places, ink-stands and griddles. It can also be used for fence posts, as done in some parts of New England. Pounded fine, and mixed with a little grease or tallow, it forms a very durable article to lessen friction in the axles of wagons and carriages. To obtain it for this purpose, wagoners come from a distance, and consider it to be neater, better and more lasting for that use than anything else.

It has already been remarked that most of the mountains in the valley of the Llano river are isolated, and this isolation on a nearly level plain, causes them to appear much higher than they really are. The highest is the Pack-saddle, or Llano Mountain, in the eastern part of the county. It has an elevation of eleven hundred and fifty feet above its base. The House Mountain is near the source of Hickory Creek, a branch of Llano river. It is about thirty miles from the town of Llano, in a westerly direction, and derives its name from being shaped like a huge oblong house with a flat roof. It's base is granite, which extends about two-thirds of the distance to its summit; the remaining one-third is a red potsdam sand-stone, which lies in massive beds of nearly horizontal strata. From the top of this singular mountain, at the height of eight hundred and fifty feet above the plain, there is a glorious view of the surrounding country. One of the most striking features in the scenery of this region, is the Enchanted Rock, situated near the south-western corner of the county. It is five hundred feet high; but as the whole valley near its base is higher than much of the surrounding country, this rock is probably fully equal in height above the sea to most of the mountains of that section. It is an immense dome shaped mass of naked red granite, flanked on the south or south-west by two smaller elevations. Within a circuit of a few miles around its base, the surface of the country is much broken and covered with rugged hills and large blocks of granite. The measurements of the heights of these mountains were made by the writer, with a single barometer and two thermometers, by first taking an observation at the base, and then one at the top. It is probable that none of these mountains are more than three thousand feet above the sea, which is much less than that of the great table land of Mexico, which has an elevation varying from four thousand to upwards of seven thousand feet.

The Llano Estacado of this State is said to be about four thousand five hundred feet above the Gulf of Mexico. None of the mountains of Llano county, and others in Western Texas, are as high as the more elevated table lands of Mexico and Texas.

That a large part of North-western and Western Texas was once a continuation of, or a similar table land, is evident from the strata of rocks of its isolated hills or mountains so like to those of the neighboring hills and plateaus that the most superficial observer cannot fail to be convinced that the whole were once continuous. The Llano valley originated from denudation, and also many other plains and valleys among the Paleozoic and Mesozoic rocks. This denudation took place after the Eocene of Tertiary period was formed, because we find water-worn rocks and pebbles both of the Paleozoic and Cretaceous formations, containing their characteristic fossils scattered profusely over the surface of large portions of many of the counties south of Austin, as far as Fayette county. Some of the finer particles were carried farther, and the whole has largely contributed to the making of the rich soil of Southern Texas. None of these water-worn pebbles of the older rocks—which lie in heaps in many places—are in the Eocene strata of rocks of these southern counties, but all lie on the surface, proving that they were thus deposited after the deposition of the rocks beneath them.

The valley of the Llano is about seventy miles long, with a breadth of from twenty to nearly fifty miles.* It abounds in prairie and open woodlands, chiefly of post-oak, black-jack and hickory, having many native grasses on which large herds of cattle, some horses and a few sheep feed

The great extent of this and other plains in Western Texas, shows that they are not valleys formed by rivers. To break up and carry to a great distance such an immense mass of rocky matter as once filled them, required powerful oceanic currents, and long periods of time. It may have been a sudden breaking up of the rocky strata which gave the waters an increased force and more resistance, which joined to the greater surface of the rocks exposed, caused them to be sooner dissolved, or swept away. Whatever may have been the cause or length of time required to accomplish it; one thing is certain, we can see that it has been done, and done very effectually, leaving no large or small blocks of lime-stone scattered over the Llano valley, at least those portions which we visited. That the elevation of this portion of Texas from beneath the sea has been gradual, is demonstrated by the numerous terraces on the Colorado river, and also those in the cretaceous hills about forty miles from

Austin, on the Fredericksburg road, where there are three or four ancient sea beaches from near the base of the hills, upwards to near their summits, along one of which the road winds for miles.

The views obtained from the summits of the mountains of Llano, are rarely excelled for bold scenery and beauty of landscape. One or more of the sides of many of them are nearly perpendicular or jagged and rough with huge rocks.

The Paliozoic and Cretaceous hills which surround the valley, also often present high and irregular walls of sand-stones and lime-stones. Rivers and streams wind among the mountains here and there amid woodland and prairie. Those who ascend the highest mountains east of the Mississippi river, after toiling for hours upward, finally arrive, weary, at the top, amid cold winds and misty clouds, which hide both mountains and valleys from view. Such is the fate of most of those mountain climbers; for seldom are those mountain tops, at mid-day, uncovered with clouds. Under the clear skies of Western Texas, those who visit these delightful mountains cannot fail to be pleased. There are also many other attractions here. The falls of Falls Creek, in the north-eastern part of the valley a few rods from the Colorado river, are about one hundred and five feet perpendicular height. The stream is about sixty feet wide at the top of the fall and descends into a basin of about half an acre in extent, of deep clear water, fine for both bathing and fishing. Ferns, mosses and climbing plants hang in green festoons from the high rocky precipices which are on each side of the sheet of falling water. Cedars and other evergreens grow on the surrounding rocky cliffs, and both cedars and live-oaks abound on the broad plateau at the foot of the falls from which the ascent is by three or four terraces of a few feet each, into the Llano valley. We were told that there is a fine sulphur spring on the Colorado river, not far above these falls, which our limited time did not permit us to visit. These things have an economic value to the people of the State, affording advantages for summer resort which are rarely equalled; such as a pure, healthy atmosphere, mountains, springs, water-falls, bathing, fishing, hunting, fine drives, and horse-back rides over the plain, fine climbs up the hills to enjoy charming views of varied scenery from their tops. It is just the place for invalids to get strong, and for the healthy to become more robust. Much money is spent annually in visiting places abroad far less attractive. Suitable buildings here and at Lampasas Springs, in the adjoining county, will, in due time, draw crowds; for surely there are no mineral springs, watering places or other places of resort in the Atlantic States, which have such a combination of natural advantages for true enjoyment as are here within a circuit of a few miles.

The Azoic rocks of this section trend north-east and south-west, being in the same line ot upheavel, as the rocks of the same period in the Ozark Mountains of Arkansas, and the Iron Mountains of Missouri. Garnets are quite common in the granite of Llano, and further explorations will probably bring to light other characteristic minerals of that rock.

PRIMORDIAL OR POTSDAM PERIOD.

The Potsdam strata here lies unconformably upon the Azoic rocks in either horizontal strata or in layers inclined at small angles. Near Honey Creek, and also near the head waters of the Little Llano, it can be seen directly overlying the Azoic metamorphic rocks. It consists of red, yellowish white and grey sand-stones in strata, alternating often with grey limestones of different shades, some of which are nearly white. In Llano county its fossils are more abundant than in either Burnet, Mason or San Saba counties, where including the calciferous sand rock of the same period, forms the larger portion of the rocky strata. It's recognized characteristic fossils are of the following genera: Lingula Bathyurus, Conocephalus, Dicellocephalus, Agnostus, Arionellus, Discina and others, some of which are undetermined. There is a fine exposure of these rocks at the Pack-saddle or Llano Mountain, at the west end of which the following section was taken:

1.	Surface, dark gray lime-stone in thin layers, containing a few crinoids,	68	feet.
2.	Red sand-stone,	46	"
3.	Hard, gray siliceous lime-stone. containing Bathyurus, Lingula and other fossils,	55	feet.
4.	Light, blue grayish compact lime-stone,	172	"
5.	Soft, yellowish white sand-stone,	32	"
6.	Similar to No. 3,	12	"
7.	Reddish brown sand-stone, with Lingula and a few other fossils,	326	feet.
8.	Granite, mostly covered with soil, and sloping gradually into the valley,	439	feet.
		1150	feet.

Numbers three and six are hard, compact siliceous, lime-stones highly fossiliferous, tinged with light green spots—silicate of lime—containing Bathyurus, Lingula, Discina and other fossils.

This section is interesting on account of the great similarity in lithological character and the imbedded fossils of the two sections numbers three and six, with two hundred and four feet of lime-stone intervening, which shows that a long period of time must have elapsed between the periods of their deposition. It is uncertain whether the surface rock of this section belongs to the Primordial Period. The specimens there collected have been misplaced, and it is impossible now to identify them. We only know from notes taken at the time, that it contains crinoids. In the precipitous rocks adjoining this place were great numbers of a gregarious squirrel, which were at times quite noisy and lively. They dwell in the cliffs of rocks, in places so steep that few other animals can reach them. They are about the size of the common gray squirrel, and have the tops of their heads and shoulders black, the rest grey. The writer succeeded in obtaining a specimen, and it proved to be an undescribed species. It belongs to the Spermophile family of squirrels, and was described in the Proceedings of the Academy of Natural Sciences, of Philadelphia, by Dr. Slack, late in the year 1861, or early in 1862, as Spermophilus Buckleyii. It's food is vegetable, acorns, fruits and buds.

At but one locality have we seen the Potsdam dipping at a large angle. This is near the head waters of the Little Llano river, where the broken and upturned strata dip at an angle of about forty degrees west, ten degrees south. Here we have the following section :

1.	Hard grey limestone,	78 feet.
2.	Nodular grey limestone, in broken, disintegrating layers,	3 feet.
3.	Hard light grey limestone,	14 feet.
4.	Shale dark friable, alternating with dark grey, compact seams, with traces of fossils,	37 feet.
5.	Granite to the base, chiefly covered with rocky debris.	

No. 4 of this section has evidently been altered by heat. It's compact layers, of a foot or more in thickness, are cleavable into plates an inch or less in thickness. On the faces of these plates are rarely faint traces of fossils, the chief of which is a Dicellocephalus, mixed with nodular concretions of from four to six inches in diameter, which are probably organisms altered by heat. Several specimens of the Dicellocephalus were found in a state of perfection sufficient to identify them. These are now in the State cabinet at Austin. This is on the borders of the azoic granite, where there has been an eruption and upheaval of other granite and igneous rocks at a later period, the heat of which has altered and almost entirely destroyed their imbedded fossils. At the top of this section are a few acres comparatively level, back of which are the high hills of San Saba county, rough with calciferous sand rock, alternating with a magnesian lime rock, or Burnet marble, the whole often capped with rocks of a later age. This is a very interesting locality, for here we have some chapters in the remote history of the earth, written by the Creator on tables of stone. They tell of the existence of delicately formed animals in tranquil seas, where they lived and died, and were buried in layers of sand, which finally became indurated into the solid rock. After this, in a shallow sea, a limestone was gradually formed from age to age, to the depth of about one hundred feet. Then came the eruption of this later granite, breaking, upheaving and heating the rocks above. Quiet again reigned, the granite became cool and solid, but the waves still rolled above, and other limestones began to form, in the slow process of which many, very many other ages passed; how long, none can tell, only that it must have been very long, because the limestones above our section are several hundred feet thick, extending back in nearly horizontal layers, containing shells and other marine exuvia, far into San Saba county.

At this place horizontal beds of conglomerate, formed from the paleozoic rocks, lie along facing the cliffs. These conglomerates have been much worn away, and now stand in some places in long tabular forms or rounded pillars. In the caves and crevices of the limestone cliffs of this neighborhood, nitrate of potash, or saltpetre, is very abundant; sufficiently so to make it of economic value. Experiments have proved its utility as a manure on wheat, barley, and other cereals. It may be well for these farmers who live near these saltpetre localities in Llano, San Saba and Burnet counties, to use the dirt as a fertilizer, which is found in large heaps at the bottom of some of these rocky walls.

Farther west, in the upper part of the Llano valley, some of the Potsdam sandstones are highly ferruginous, containing a large per cent. of iron. Nodules of iron ore derived from these rocks, (some of which have imbeded shells, which are also changed into iron,) are of frequent occurrence, scattered over the surface in the neighborhood of these sandstones. At one place near the military road, a few miles north of Fort Mason, there is a bed of iron in these rocks nearly two hundred feet thick. This ore has not yet been analyzed, but judging from the weight of specimens, it seems to be little inferior to the best iron ores of Llano county. These dark red sandstones are in massive layers of nearly horizontal strata, resting immediately upon the granite. In some places they contain Lingula in great abundance, and in a high state of perfection.

About eight miles below the mouth of Falls creek, in Llano county, are salt works. The brine flows from a yellowish-white sandstone, which is varied by brownish yellow spots. It is composed of coarse sand; is easily broken, and of such an open texture that the salt water easily percolates through it in all directions. It seems to lie in a depression of the granite, and also directly upon it, covering an area about five miles wide and from eight to ten in length, in massive and nearly horizontal strata. It is at the western end of the valley of the Llano, and thins out and disappears a few miles west of the Colorado river. We found no fossils in these rocks, and only infer from its position and lithological character that it forms part of the Potsdam rocks of that region. At the base of a ridge of these rocks forty or fifty feet high, are several wells from ten to fifty feet deep, from which the salt water is drawn and evaporated in large iron kettles. As there is an abundance of fuel in the vicinity, the cost is comparatively trifling. Owing to the limited supply of brine, on an average only from twenty to thirty bushels of salt were then made in a day. To get a greater quantity of water some wells were sunk through the sandstone and several feet into the granite; but as the last named rock does not yield salt water, of course the trial proved a failure, the expense of which a very slight knowledge of geology would have prevented. This sandstone may contain beds of rock salt, over which the water runs, or the water which permeates it may come by an underground stream from other distant rocks.

Ten or twelve miles above these salt works is Swenson's Saline, in Lampasas county, where the brine is probably derived from the same series of rocks—Potsdam—and if so, they were probably made in the same ancient basin, or arm of the sea. Swenson's Saline is in a picturesque gorge, nearly two hundred feet deep, not far from the Colorado river. From the top to the bottom of the rocks, near the works, we have the following section:

1.	A compact, cherty grey siliceous limestone, containing crinoidal and other undetermined fossils,	63 feet.
2.	Light, variegated limestone, mottled with dark spots, - - - - - -	20 feet.
3.	Dark grey limestone, with Orthis and coralines,	84 feet.
4.	Black alluminous shale with lingula to the bottom of a small creek which flows through the gorge,	4 feet.
		171 feet.

In this shale two wells are sunk; one to the depth of forty feet and the other 80 feet. The bore is about four inches in diameter, and yields about a bushel of salt water per minute, twenty gallons of which make one gallon of salt. The water as it issues from the wells is pumped, by means of a small engine, into a trough 40 feet high, erected on a scaffold, on which are spread numerous cedar boughs for the purpose of increasing the evaporation From the trough the water is scattered over these branches, from whence it falls in a concentrated brine into vats below. Then it is put into kettles, where it is again evaporated. The salt here made is said to be of an excellent quality, and supplies a large section of country. A larger supply of this useful article can probably be obtained by sinking wells at other points in that vicinity.

The calciferous sand rocks and magnesian limestones of the Potsdam are in the eastern part of Burnet county, the southern half of San Saba, and several places on the outskirts of the Llano valley. They consist of siliceous and magnesian limestones, alternating in strata, which are often several feet thick. Some of these limestones are excellent marbles, and already have been used in some few instances for monumental purposes. Railroad facilities would soon bring them into general use, not alone in Texas, but throughout a large portion of the South. They are in massive beds which are nearly horizontal, or inclined at a small dip. The surface of the country, wherever they form the uppermost layers, is very rough, with large and small masses of rock in thick confusion. They are white and dark grey, with all the intermediate shades. The upper strata are sometimes cherty, and in some few places they contain large crystals of rhomb spar, twelve to eighteen inches in diameter. They have but few fossils of the genera Ophileta, Holopea, Orthocera and Bathyrus.

At the Simpson Spring, three-fourths of a mile from Mr. Hubbard's, and a few miles southeast of San Saba, the county seat of San Saba county, there is a fine exhibition of these rocks, especially the magnesian limestones, in layers of from two to three feet thick. They are white, and white clouded and tinged with grey, of a very compact texture. The bluffs here and farther up the valley are from 120 feet to 200 feet high, often perpendicular, or nearly so, ornamented with several species of yucca, cacti, ferns, climbing plants, and a few small trees and bushes, live oaks, elms, pecans and others. The rocks are alternating of light drab marble and hard white dolomite. Some of the latter has been used for tomb-stones, for which it answers equally as well as many of the imported marbles. Some of these limestones are of such a very fine compact texture that they would answer very well as a lithographic rock. Simpson's spring issues from the base of these bluffs by two outlets from the solid rock, which unite and flow in a clear streamlet of sufficient water to irrigate the neighboring farms of Simpson's creek valley. Near Mr. Hubbard's, on this creek, there is a chalybeate spring, in which the taste of iron is quite sensible. Large springs occur frequently in the valleys and ravines of San Saba county, many of which afford sufficient water for irrigating. At the town of San Saba is a large spring, having an area of nearly one-fourth of an acre of the clearest water, which gives rise to a large stream and affords a constant supply of water for a good flouring mill, where most of the flour for the county is made. The calciferous sand rock, and the mountain limestone which lies immediately above, are the prevailing rocks of the southern portion of this county The latter is of great value for its fine marbles and compact limestones, suitable for monumental purposes and for durable architecture. The Trenton limestone has been recognized in but a few places, the whole needing further examination. It's chief fossils are of the following genera, Belerophon, Maclurea, Orthis, Murchisonia, Pleurotomaria and others. The reader must bear in mind that we only made a general reconnoisance of this and other portions of the State, and not a detailed survey. The Trenton limestones, including the Galena limestones, both of which are considered as belonging to the same geological period by some of our best geologists, are the series in which such large quantities of lead have been found, and are still being found in the northwestern part of the State of Illinois, Southern Wisconsin, and the northeastern portion of Iowa. The very productive lead mines of Missouri are in the calciferous sand rock. We may expect to find lead ore in these rocks, which abound here and in other parts of the State, but which have as yet received a very cursory geological examination. The calciferous sand rocks are probably about three hundred feet thick, making the entire thickness of the Potsdam rocks to amount to eight hundred feet, as seen in this and the adjoining counties. North of San Saba river in the same county are some carboniferous rocks, and should coal be found there it could be very easily transported to the great iron region of Llano county. This is so much to be desired that diligent search for coal should be made in that section.

About three miles above the mouth of Pecan Bayou are sandstone hills in massive beds. It is a fine-grained, compact rock, well adapted for grind-stones, for which it has been used. It is also used for flagging and hearth-stones, and building, for all which purposes it is highly valuable.

Wheat is cultivated to a considerable extent in San Saba county, and forty bushels to the acre is said to be not an uncommon crop. Barley does well, and its culture is considered by many to be more profitable than corn. It is much more certain, because it matures before the drouths of summer. Mr. Baker, who lives ten miles above the county seat, in the San Saba valley, in 1860 sowed three bushels of barley, and it gave a return of between seventy and eighty bushels. The chief agricultural business of the county is the keeping of stock—cattle, horses and sheep, principally the former, but they all thrive on the very nutritious mesquite grasses of its hills and valleys. All of the latter, and a large part of the county north of the San Saba river, has a dark fertile soil, which in due time will support a large population.

The geological formations which are in this State between the Trenton limestone and carboniferous, have not been sufficiently studied to be described, nor have they even been nearly all recognized. It is probable we have part of the Devonian rocks and the Sub-carboniferous. As this report is intended only to give a brief sketch of those things which have fallen under our observation which may be ot use to the whole people of Texas, we omit many points of scientific and minor interest, and proceed at once to the carboniferous and coal-bearing rocks. These require a much longer and more detailed geological examination than they have yet received. We made but a flying trip to Fort Belknap and the adjacent region. We saw that the coal measures, in their characteristic forms, occupy a large region of country in Young and its neighboring counties. The rocks consist of sandstones, limestones and shells; with seams of bituminous coal. Some of the sandstones are ripple marked, and the limestones have some of the well known fossils peculiar to the coal measures of the Western States, in the valley of the Mississippi, such as Spirifer cameratus, Athyris subtilita, Chonetes mesoloba, Fusilina cylindrica, Productus Rogersii, and semireticulatus. The vegetable remains are very numerous and well preserved, among which are the genera Neuropteris, Sphenophylum, Pecopteris and Calamites, of which the last is very abundant. There is a bed of coal about three-fourths of a mile above Fort Belknap, in a small ravine near the Colorado river. From this seam coal was obtained, both for fuel and for blacksmithing, when the Fort was occupied by the Government troops. After the removal of the troops the bank above the coal caved in, so that now there is no view of the coal bed which was worked. The layer of coal at this place is said to be between three and four feet thick.

The following section was taken about two hundred yards above, in the same ravine:

1.	Sandstone and shale alternating, - -	4 feet.
2.	Hard grey sandstone, - - -	1 foot.
3.	Blue and ochreous shale, - - -	1½ feet.
4.	Coal, - - - - - -	1½ feet.
5.	Blue fire-clay, - - - - -	4½ feet.
6.	Black sandstone, (laminal), - -	3 feet.
7.	Bed of coal exposed to bottom of ravine, but not to its bottom, - - - -	2 feet.

This ravine has not a running stream, and at the time of our visit was partly filled with dirt and stones. No. 5 of the above section is a good potters' clay. There are from two to four seams of coal in the vicinity of Fort Belknap, one or more of which are met in sinking wells throughout that region. The country is undulating, with hills of from one hundred to two hnndred feet high, and gentle slopes, excepting occasionally on the banks of streams, or the sides of a few rocky hills. Its timber is live-oak, postoak, blackjack, elm, hickory, cotton-wood, mesquit, and a few other small trees and shrubs. The prairies are small. Stock raising is the chief business of the farmers, but sufficient corn and wheat are grown for home use. The soil of many of the prairies is of an excellent quality. On Hubbard's creek there is said to be good coal, which is used by blacksmiths. We were shown coal from this place of quite a hard texture, breaking with a concoidal fracture like cannel coal The blacksmiths of the country say it is a good quality of bituminous coal, and little if any different from the coal of the western coal fields in Ohio, Illinois and Kentucky. The strata of this section are horizontal, or dip at an angle of from three to five degrees to the northeast.

On Whisky creek, about two miles north of Fort Belknap, there is a fine exposure of the coal strata, of which the following is a section taken near its mouth, and not far from the Colorado river:

1.	Soil sandy loam, - - - - -	1 foot
2.	Sandstone (conglomerate), - -	44 feet
3.	Coal, - - - - - -	1½ feet
4.	Sandstone and shale alternately, - -	8 feet

5.	Coal,	3½ feet
6.	Sandstone,	26 feet
7.	Shale and limestone, fossiliferons,	2 feet
8.	Coal,	1½ feet
9.	Light grey friable shale, to bed of stone	3 feet
		90½ feet

A few hundred yards higher up the stream, where coal has been mined to some extent, and where one man is said to have dug out seventy-five bushels in a day, there is the following section:

1.	Shale covered with sandstone, extending far back and not measured,	—— feet
2.	Black, yellow and ash shales	10 feet
3.	Fine-grained sandstones,	½ foot
4.	Blue fire-clay,	1½ feet
5.	Coal,	4 feet
6.	Clay containing selinite,	½ foot
7.	Slope to the creek,	——

Here the sandstone above the coal contains coal plants and is ripple marked. There are several other places on Whisky creek where the coal crops out. North of Fort Belknap, at the distance of about six miles, near Judge Harmenson's, is a bed of coal five feet thick. This bed is exposed along the base of a hill to a distance of from twenty to twenty-five yards. Coal has also been obtained here both for fuel and for blacksmithing.

On the Camp Colorado road, in several places in Buchanan county, we saw beds of coal exposed in the hill sides. In Palo Pinto county good bituminous coal is said to occur, and to be used by the blacksmiths of that section. It is probable that there is a large field of bituminous coal, of good quality, in Palo Pinto, Young, and their adjacent counties.

Copper is said to be on the head waters of the Little Wichita, in a region which is yet unsettled. The settlements do not extend more than about twelve miles north of Fort Belknap, a few miles beyond which is the range for buffalo during winter, when they are there by thousands, and are killed in such nnmbers that hogs are sometimes fattened on buffalo meat. We ate some of the buffalo bacon, and unanimously decided that corn-made bacon is preferable. The streams which feed the Great and Little Wichita rivers are most of them said to be brackish and impure, from the mineral ingredients they contain in solution, which has been a hindrance, in part, to the settlement of that section. Good cisterns of ample dimensions, sufficient to contain all the water needed for family use, would remedy the difficulty, because the waters of these streams are not deleterious or distasteful to horses, cattle or buffalo. It is also highly probable that wells throughout a large extent of this country would afford good water, for most of the streams become mineralized at their sources in the copper and gypsum hills. Good rainwater is, however, the most healtny in any country, and should always be preferred.

In the State geological collection are numerous specimens of copper ore from Western and Northwestern Texas, but as they are now mostly without labels it is impossible to specify their exact localities. From the same region we also have a great many specimens of Galena, or sulphuret of lead, some of which seem to contain quite a large per cent of silver. We only mention this that the people of the State may know that the unsettled western and northwestern portions of the State are probably rich in valuable ores; nor is there any reason, from what we already know of their geology, as derived from reports and specimens, why they should no tprove to be equally as rich in mineral resources as the neighboring country of Mexico.

On the upper Red River, lying partly in Texas and partly in the Indian Territory, is the largest gypsum formation known. It is about 350 miles long and from 100 to 50 miles broad. It is said to extend down the river to about forty miles north of Preston. This vast deposit will yet prove to be a great source of wealth to the State, affording a valuable fertilizer to all sandy clay soils within its borders, or in those of other States. The use of this article with red clover has increased the value of many farms in the old States ten fold. It is also used extensively to give a hard finish to walls, and is often called Plaster of Paris.

We frequently heard, while passing through the western frontier counties, traditionary reports of rich silver mines near the old Spanish fort of San Saba, in Menard county. The mines are said to have been very productive, and to have been worked by some of the old Spaniards. Companies from the western settlements have at different times gone to this old fort and searched in its vicinity in vain for this silver mine. It is very probable that the calciferous sand rock, and it may be also the Trenton rocks abound in that country. As before remarked, these are the rocks containing the rich deposits of lead in the States of the upper Mississippi valley As silver often occurs in ores mixed with lead, it may be that these reports about the silver mine are true. A geological examination of that country would settle the question. The small expense required in separating the lead from the ore, renders a good mine of it one of the most profitable. Hence the lead mines of Illinois, Iowa, Wisconsin and Missouri, have contributed largely towards the settlement and development of those States, giving birth to cities, towns, railroads, steamboats, and new life to their commerce and agriculture.

We should have remarked, when treating of the calciferous rocks of San Saba and Llano, that when in the latter county we were shown specimens of the sulphuret of lead, by one of the settlers in that region, but the person who had them did not seem disposed to reveal the precise locality in which they were found, excepting that it was in Llano county.

In 1861, the Hon. W. P. Saufley (Senator from Davis, Bowie and Marion counties) took some specimens of iron ore from Marion county, in the north-eastern part of the State, to New Orleans and Montgomery, in Alabama, which were tested by chemists in both these places, and said by them to yield from 70 to 75 per cent of metalic iron, and to be equal to the best Swedish iron. This ore was worked at the iron works of Mr. Nash, about one mile from Cypress Bayou, a navigable stream in Marion county, during the late war. In Davis county there are two founderies near Sulphur river, a tributary of the Red River. These iron ores are in a timber region where there are forests of pine and other trees. Coal also occurs in beds, which crop out along the Sulphur river, in both Davis and Bowie counties. We are indebted to Col. Saufley for this information with regard to the iron ores and mineral coal of that section.

Petroleum is a mineral oil derived from the decomposition of organic matter, principally in a vegetable form, being mostly made by chemical changes in vegetable matter, beneath the surface of the earth. It has been found in the rocks of nearly every geological age above the Azoic, but only in large quantities near, or at no great distance from extensive deposits of coal or lignite, both of which are, as we have before remarked, of undoubted vegetable origin. Under heat and pressure it is generated and made in coal beds, from whence it may run in streams through the crevices of the rocky strata below, or be there held in reservoirs until "struck" by the auger of some fortunate company or individual boring through the rocks above. We can now see why in the oil regions some wells cease to flow. The reservoir may have become exhausted; or the oil stream may have been struck still higher up the stream or valley by the sinking of one or more wells.

Petroleum, although known to the ancients and by them used to a limited extent, has never been obtained in immense quantities and subjected to a refining process, so as to render it a cheap safe and excellent illuminating agent, until recently. We say safe, because if properly refined and deprived of its more volatile matters, such as benzole, it is not subject to explosion in good lamps. Buy a good article of kerosene, have your lamps filled and trimmed in the morning, and you need have no fears that they will explode. Petroleum has added so much to the wealth, resources and commerce of some parts of the Northern States, and we may add comfort to the entire country by giving a cheap, brilliant light, in place of the old dim tallow candle, which was in general use in a large portion of the United States, that it demands from us quite an extended notice, because we believe that it will ere long be found in abundance in many parts of Texas. Petroleum exists in a fluid form on the shores of the Caspian Sea and in the Birman Empire, where at Rangoon there are upwards of five hundred naptha wells, which yield annually about 412,000 hogsheads. When inspissated, or somewhat indurated, it is called asphaltum or bitumen, in which form (partly) there is a wonderful lake of it in the Island of Trinidad, a mile and a half in circumference, which is in a more or less solid form around its shores and over a large portion of its surface, but boiling in the middle, from whence it increases in hardness toward its shores. According to Manross "the solidified bitumen appears as if it had cooled at the surface when boiling in large bubbles. The ascent to the lake from the sea, a distance of three-fourths of a mile, is covered with hardened pitch, on which trees and vegetables flourish, and about Point La Braye the masses of pitch look like black rocks among the foliage. The lake is underlaid by a bed of mineral coal." Two ship loads of the Trinidad pitch were sent by Admiral Cochran to England, but the oil required, to render it fit for use so much expense, and the present rectifying process not then being understood, the project of importing more was abandoned. At Inniskillen, in Canada West, according to the Geological Report of Logan, the bitumen is in some places two feet deep.

Petroleum was first brought to notice in our own country by the Seneca Indians, about a century ago. They used it as an ointment for their wounds, and in some of their religious ceremonies. A spring on Oil Creek, in Pennsylvania, was covered with the oil, from whence it was skimmed, and sold in small quantities as a medicine, under the name of "Seneca oil." The Oil Creek spring and its adjacent lands was sold a few years since by the Seneca Indians for a small sum, much to the present regret of their leading men, for these lands are now worth many millions, and have been the most productive in oil of any in the country. In boring for salt near Tarentum, a town about thirty-five miles above Pittsburg, oil was "struck" in 1845, which, when tested, proved to be similar in its chemical composition to other coal oils, which were then being manufactured quite extensively in many places from the bitumenous and cannel coal of the Western coal fields. However, as its refining process was not then fully understood, its value was not appreciated.

Twelve years later, Messrs. Bowditch and Drake of New Haven, began boring for oil at Titusville, on Oil Creek, high up the Alleghany, in the hilly region of Pennsylvania, where lands were held at little value. Their work progressed slowly and at intervals so that it was not until August 1859, that oil was struck at the depth of seventy-one feet, which flowed out at the surface at the rate of 400 gallons daily. The oil excitement then began, and before the termination of 1860, about 2,000 wells and borings were made, of which seventy-four of the largest gave daily 1,165 gallons, worth, at its then market value, about ($10,000) ten thousand dollars. After this wells were sunk deeper to the depth of six hundred or seven hundred feet, which gave an increased flow of oil, and in one instance one well gave the enormous amount of 3,000 barrels in a single day. To take care of these amounts not being practical or economical, contrivances were made to stop and regulate the flow of oil, in order to take advantage of the supply of casks, labor and the market. To guard against fire, great precautions were necessary, on which account it is not considered advisable to have a large quantity of oil in store, at the diggings, where so many people are habitual smokers of pipes and cigars; for, notwithstanding smoking is strictly forbidden in the vicinity of the petroleum, some terrible conflagrations have taken place in the oil region.

The discovery of petroleum in such quantities soon suspended the operations which were being made in the manufacture of oil from cannel and bitumenous coal, of which there were about fifty-six factories in the United States, mostly in Ohio, Kentucky and other States, abounding in cannel or bitumenous coal. The capital which was thus invested has been estimated at $4,000,000, employing between 2,000 and 3,000 men, women and children. This business, although then considered large, is but a small item compared with the capital invested, and the amount of labor now engaged, either directly or indirectly, in the petroleum business. The oil wells in north-western Pennsylvania have made a hilly, poor section of country rich, in which ciites have been built, and to which railroads have been made by its petroleum. Crowds have gathered there from far and near, all anxious to become very wealthy, for they have heard or read that sudden and large fortunes were made at the "oil diggings;" and why may not they do likewise. There a man may be so poor as to be deemed unworthy of being trusted to the amount of five dollars in the morning and be a millionaire in the evening, for he owns either the whole or part of a well which strikes the oil stream or fountain, and it rushes to the surface at the rate of several hundreds of barrels per day. Still, boring for oil in what is termed the oil region of Pennsylvania, is a very uncertain business, because it is impossible, from external indications, to determine the exact spot of the oil stream or reservoir beneath the surface. Hence a well may be sunk within a few feet of the supply of oil, and yet not obtain any. Again wells sometimes cease to flow, the supply may give out, or the stream may have been "tapped" by other wells higher up the valley. With all its uncertainties the business increases rapidly. In the year ending June 1st, 1866, there were exported from the single port of New York 11,212,647 gallons of petroleum, which is but a small part of what is retained in the country for home consumption.

The oil wells in Pennsylvania and Virginia are sometimes sunk into the subcarboniferous strata, and at others still lower into the Devonian, both of which are beneath the coal measures. In the Northern counties of Texas, bordering on the Red River, and also in the Indian Territory, near the State line, bitumenous springs occur. Mr. Russel, of the Texas Boundary Commission, told us of one which he saw that had a constant flow. This is somewhere in that section, but we cannot specify the locality. In the geological rooms are specimens of indurated petroleum or bitumen from Northern Texas. Specimens of bitumen have been lately brought to us which are said to have flowed from rocks a few miles north of Austin. There are tar springs near the town of Burnet, in Burnet county, from which the bitumen is said to flow at particular seasons. There are said to be several situated in a line extending nearly north-east and south-west. We visited one of these springs in the fall of 1860. It was then dry, but indurated bitumen was on the rocks. This spring is on the top of a small cretaceous hill. Bitumen is also reported to be found in the vicinity of Sour Lake, in the south-eastern part of the State, and in the neighborhood of Nacogdoches. The Northern coal fields and the lignite beds of Southern and Eastern Texas show that we have large quantities of petroleum-making materials; and the coal oil or bitumen which exudes from beneath the surface in various sections, affords conclusive evidence that its streams or reservoirs are in the depths below. Those who are fortunate enough to tap them will realize fortunes.

Kerosene is the best remedy we have tried for destroying insects or expelling them from their accustomed haunts. Its liberal application in the crevices of bedsteads or in the cracks of a room, will expel the vermin. We are now occupying rooms in which these insects were very troublesome a few weeks ago, but by means of this remedy we are now rid of the annoyance. It will also kill and drive ants away. It is said that a sheep skin with the wool on, saturated with kerosene and tied around a fruit or other tree, will protect it from ants. All oils are destructive to insects. Insects have breathing pores in their bodies which, closed by oil or greese, stops the breath and smothers them. Coal oil well diluted with water and sprinkled over vines or plants will protect them from insects. The oil must be frequently stirred into the water, or it will rise to the top and not be distributed equally. It is said a tablespoon full of kerosene in a common garden water pot of water, sprinkled over a seed bed 3 feet by 5, gives it ample protection, and it also acts as a manure. Cabbage plants can thus be saved from the little jumping beetles. Any oil is good, but coal oil is easily obtained, can be easily mixed with water and applied with a watering pot or syringe to the plants or ants, for these last are cute rascals, and often are a great nuisance both to the gardener and housekeeper. We found this kerosene preventative in the newspapers, and as far as we have tried it does well within doors. It certainly is worth the trial of horticulturists.

The cretaceous rocks prevail over a large area in the State. We have recognized them in the counties of Travis, Hays, Comal, Bexar, Blanco, Gillespie, Williamson, Burnet, Bell, Mason, McCulloch, Lampasas, Coryelle, McLennan, Falls, Bosque, Hill, Navarro, Hamilton, Comanche, Crown, Coleman, Limestone, Freestone, Menard, Callahan, Johnson, Ellis, Erath, and some few other counties. It must not be understood that they constitute the entire series of rocks of these counties, but that as far as we have observed they form their larger portion, with perhaps the exception of the counties of Burnet, Lampasas and Mason. They are mostly limestones, some of which are hard and compact, and suitable for building; others are soft and friable. Cherty nodules are sometimes imbedded in their strata which are occasionally nearly as white and soft as chalk. They vary very much in color, from a dark grey to a pale yellowish white. Their strata are horizontal or slightly inclined, showing that there has been little disturbance from below since their deposition, which has taken place since the upheaval of the granite and other igneous rocks. In the vicinity of Fredericksburg and in some parts of Mason county, we have seen the cretaceous rocks resting directly upon the granite in horizontal strata, unaltered by heat, and containing an abundance of their characteristic fossils in a fine state of preservation, viz: Holaster simplex, Cidaris hemigranosus, Turrilites Brazoensis, Gryphea Pitcheri, Ostrea subovata, and many others. During the deposition of the rocks of this Mesozoic Age life, both animal and vegetable, was more abundant and developed to a greater size than when the paleozoic rocks were formed. The cretaceous rocks of Texas abound in organic remains, especially in shells. In some places they occur in heaps as if they had thus been washed together by the waves of the old oceans. Thus placed, Ostreas and Exogyras are met quite frequently on the sides of the cretaceous hills. Near the base of Comanche Peak Gryphea Pitcheris are in layers two to three feet thick, over an area of several rods in extent, in a very perfect state of preservation, as if they had lived and died there, as they undoubtedly did, else they would be broken and waterworn. In McLennan county, not far from Waco, Ammonites are found of great size, some of which are nearly two feet in diameter. However, this is a less size by at least one foot than they have been obtained in other States west of the Mississippi river. We have seen Inoscerami more than one foot in diameter in the cretaceous rocks near Austin, where these shells are quite common. Shark's teeth are quite numerous in some of the Northern counties bordering on the Red river. Some of these, on account of their shape, are called by the children petrified bird tongues. As yet few fossils of a reptilian character have been found in our cretaceous rocks. Fossil wood is of quite frequent occurrence at the surface of some of them, and we have impressions of leaves from some of their strata, which have not yet received sufficient study to be described, nor have these rocks been traced sufficiently to have their boundaries accurately defined, or their strata properly classified. The attempts towards this which have been made, being founded at least in part on imperfect data and superficial examinations, are certainly erroneous in some particulars. They have a variable thickness extending up to nearly one thousand feet; and it may be that they are still thicker in some of the unexamined regions.

Santa Anna's Peak, Comanche Peak, and many other isolated elevations are but the monuments left which inform us that the whole region, in which they are situated, was once a table land whose surface was higher than those "mountain" tops now are, because during many ages they have been undergoing a slow yet sure leveling process, which is now being continued by the storms of winter and summer, all of which convey more or less of their materials into the plains below. They are not everlasting hills, yet lasting compared with the puny monuments which vain man attempts to rear for himself.

The green sands of New Jersey, well known for their great fertilizing powers, belong to the cretaceons period. Lands in New Jersey, which in Texas would be considered worthless, have, by the application of these green sands, been rendered worth from fifty to one hundred dollars per acre for agricultural and horticultural purposes. Fortunately Texas has comparatively little barren soil throughout its vast area as far as the settlements extend; especially is this true of the counties where the cretaceous limestones prevail. They possess a soil of remarkable fertility--a dark, rich and deep vegetable mould—which in good seasons produces, when well cultivated, large returns of all crops suited to the climate. The cretaceons rocks do not abound in gold and silver, or other precious ores; but what is far better they afford a soil which, with little labor, fills the pockets of the agriculturist with gold and silver ready coined, which needs no essay of the chemist to tell its true value.

The writer assisted in the survey of Navarro county, which has a gently undulating surface of prairie and wood land; the former being in the larger proportion. On the branches of its streams and on its bottom lands the timber is of great size, particularly its oaks, pecans and cedars. These last are often more than one hundred feet high, producing seven rail cuts to one tree, the rails being not less than 10 feet, and some twelve feet long. We measured cedar sills of a bridge over Richland Creek which were fifty-two feet long, and fourteen by ten inches in diameter. We saw and measured other cedars which were between three and four feet in diameter. Shingles, sufficient to cover the large court house of that county, were made from a single cedar tree four and a half feet in diameter. We know of no other section in the United States which produces cedar trees of such large dimensions. Captain Love, a resident there, told us that he had assisted in measuring a pecan tree with a surveyor's chain, which was twenty-three feet in circumference, growing on the banks of the Trinity river in that county. Three species of native grapes are common here, the mustang, post oak and the winter grape. The mustang is so abundant as to be used in the manufacture of wine of a superior quality, which we tested on several occasions with the hospitable inhabitants of that region. Plums, of which there are three native species, do well; also peaches. These last are in general cultivation. The soil is generally of great depth, being often five or six feet deep, which accounts for the large growth of the timber. Good crops of wheat, barley, rye, oats, corn and cotton are raised. Deep culture and planting the early corn, insures good crops, even if drought prevails during the summer. The principal business, however, is stock raising, the prairies being covered with many species of nutritious grasses. The rocks of this county are highly fossiliferous, and many of the shells are in a beautiful state of preservation, Inosceramus, Gervillia, Turitilla, etc.

At Comanche Peak, in Johnson county, in the Northern part of the State, and about one mile from the Brazos river, there is a fine display of cretaceous rocks. This "Peak" is about six hundred feet high, above the bed of the Brazos river, and is a flat-topped hill about one mile and a half long, and one-fourth of a mile wide. A portion of the hill, about two hundred yards long, is separated from the Southern part by a gap about fifty rods wide, and its bottom about one hundred and thirty feet below the summit. The upper part of this Northern portion, to the depth of about one hundred and fifteen feet, is composed chiefly of a white hippurite limestone, beneath which there is a bench of grey limestone, intercalated with strata extending about seventy rods west, which forms a low escarpment containing great quantities of Exogyra Texense, Holaster simplex, Lima Wacoensis and others, to the depth of about thirty feet. Beneath this are massive beds composed in many places almost entirely of the shells of Gryphea Pitcheri and Exogyra Texense. These beds are about seventy-five feet thick. At the Southern extremity of the Peak the Gryphite beds are about two hundred feet thick, the specimens of Gryphea Pitcheri becoming scarcer in the ascending series, and rare at the top of the beds; the upper portion containing also Exogyra Texense, Janira occidentalis, Lima Wacoensis, Toxaster, Holaster simplex, &c., in small quantities. Above the Gryphite bed are massive limestone strata, abounding in Hippurites, Caprotina, etc. The cretaceous rocks of Texas, being mostly limestones in fossiliferous beds, are sedimentary and coraline, having been slowly made, mostly by molluscous and radiated animals, in a manner similar to that which is now forming coral and other islands in the Pacific and

Indian Oceans, hence, as has been remarked, they do not contain valuable ores. They contain phosphates and other ingredients common in marls, which are used by agriculturists as fertilizers on barren soils, or soils which are little productive in the old settled and less favored States. In the cretaceous region of Texas these expensive methods of improving the soil will not have to be made at least in the present age.

When the writer left the State in July 1861, the artesian well at Austin was nearly nine hundred feet deep, and still in the cretaceous rocks. From other strata of this period of a different character, lying above the surface rocks of this well, the cretaceous rocks of Texas cannot be less than fifteen hundred feet thick, and probably much more. This artesian well now has a constant flow at the surface of mineral water in a small stream. The water is clear and drank by many persons; some who are invalids in order to become healthier, others who are well to test its effects or to be fashionable. It contains magnesia, soda and a trace of iron, and is said by some to be good for dyspepsia. We think those who are well will receive little benefit from drinking this or any other mineral water. At the depth of 1,160 feet the shaft used in boring broke and is still in the well. This and the war caused the work to be suspended. The flow of water would probably be much greater if it were not impeded by the broken shaft. Cattle and horses are fond of the water, drinking it freely, although there is plenty of other water in the neighboring streams to which they have free access. It is desirable that the boring should be resumed and the work brought to a successful termination, to obtain water sufficient to have fountains on the Capitol grounds, and also to irrigate them and supply the city with water. This and the planting of a few ornamental trees and shrubs would render the Capitol grounds of almost unequaled beauty, and a delightful place of resort to our citizens and strangers. State pride demands this; nor do we see any reason in the geological formation of the country to anticipate a failure. Artesian wells are destined to become a highly important item in our domestic economy and add greatly to the agricultural wealth of the State, and the comfort of its inhabitants, particularly in sections liable to drought or deficient in constant running streams. These wells are artificial springs from which the water gushes on the same principle that it flows from the natural spring. The water in subterranean streams runs through the rocky strata from an up country, and whenever it finds an opening to the surface rushes up, forced partly, perhaps, in some instances by the pressure of the overlying rocks, but oftener impelled from the force given by its high and perhaps distant fountains. These underground streams are most common in limestone rocks through which they freely percolate and form larger openings by wearing away the rocks and carrying off the matter in solution. It is thus that the Mammoth Cave, in Kentucky, and other wonderful grottos have been made. Those who have visited the mammoth cave will never forget the river Styx, and the wonders presented during a ride on its waters to the Elysian fields beyond. We know of no part of the world which has so many and such large springs as are in most of the counties west and south-west from Austin, some of which come to the surface with the volume and force of underground rivers, as the Comal and San Marcos, affording water power sufficient for the largest mills and manufactories. Surely no part of the United States is equal to this section in this respect; not only is the supply of water constant, but of remarkable clearness and transparency. The cold temperature of the San Marcos river, and many other large springs, indicates that they do not come from a great depth, because experiments prove that the deeper we penetrate beneath the surface the warmer it becomes, that is after the limit of surface action is passed, which in temperate climates is at the depth of from twenty-five to thirty feet, while under the equator it amounts to only three or four feet, and but little more under the frigid zone. The rate of the increase of temperature in descending is 1° F. for each fifty or sixty feet of descent. The artesian well in the suburbs of Paris, in France, at the Hotel des Invalides at Grenile, where the water is derived from the depth of 2,000 feet, has a temperature of 85° F., which is equal to 1° F. for every 60 feet of descent. At Neu Selzwerk, a town in Westphalia, in Germany, there is an artesian well 2,200 feet deep, the temperature of which, at the bottom, is 91° F. or 1° F. for each 50 feet of descent. Some of the French savans have proposed to have an approximation to a tropical climate at the Jardin Des Plantes and Zoological Gardens of Paris by boring to the depth of 3,000 feet, and obtain water at a temperature of 200° F., and with this hot water, conveyed in pipes, warm the grounds containing tropical plants and animals.

The artesian well at St. Louis, Missouri, is 2,200 feet deep. We do not know the amount of water obtained, which is said not to be pure. The well at Louisville, Kentucky, at the depth of 208 feet, affords an abundance of water, which is, however, a little brackish. In Alabama and Mississippi artesian wells are used for agricultural purposes, and also in California. In the two former States water is generally obtained at the depth of about 600 feet or less, but in some rare instances wells have been sunk to the depth of 1,200 feet before obtaining enough water. In some of these wells the water does not rise to the surface, but so near that it is obtained by digging large wells to the required depth, and then pumping or drawing the water.

The high lands which give rise to many of the springs and small rivers of the counties south-west of Austin, are probably nearly due west from that city, and a continuation of the azoic rocks of Llano, before mentioned, which trend in that direction. As has been before remarked, the cold temperature of these springs proves that they do not come from a great depth, hence should borings for water be made in these south-western counties, it will probably be obtained at a moderate depth, unless near the coast and far from lands high enough to give origin to springs.

The tertiary rocks have been observed in many of the counties south of Austin, and also in many of those east of the Trinity river, and it is probable that they are the prevailing rocks not only of Southern Texas, but also of most of the State lying east of the Trinity. They consist of sandstones and limestones, the former being often highly ferruginous, abounding in iron ores, some of which would pay well for the working, as the cost of excavating them would be trifling compared to that incurred in working many of the iron mines of Pennsylvania, New York, and some of the New England States, where the ore is often obtained at a depth of more than fifty feet from veins in the rocks. Texas abounds in iron ores of all grades, some of the best in the azoic rocks of Llano have already been described. We have good hematites which will yield 70 per cent. of metalic iron from some of the tertiary deposits in the north-eastern counties of Texas. Some of the sandstones of Bastrop county are very fine grained and friable, and also so highly charged with the red oxide of iron as to be useful as a pigment. Some have already been thus used in painting wagons and agricultural implements for which they seem to answer equally as well as the common red ochre of the shops. This red oxide occurs not far from Judge Eastland's, west of the Colorado river. Bastrop county has its prairies of deep, rich, black soil, and sandstone hills covered with post oak and black jack, which are not so productive, but which have already been a great source of wealth to the county in pine lumber. Although a large part of these pines have already been cut down, still enough remains to supply building material to many of the counties in the western and central parts of the

State. There are two species of pine in Bastrop, viz: Pinus mitis and Pinus taeda of the botanists, both of which make a very good building material. The former is the most abundant. Neither of these pines abound as much in rosin as the long-leafed pine (Pinus palustris) in South-eastern Texas, nor are they valued as high in distant markets for building purposes, especially for the inside work of houses where a high finish, joined with durability, is wanted. Mixed with the tertiary sandstones a conglomerate often occurs which is made up of the fragments of the older rocks. The banks on the roadsides and along streams often contain sand and pebbles mixed, some of which would be useful for macadamizing roads, and others for concrete work in walls, which is considered by many to be equally as strong and durable as the best rocks. The walls of the court house at Seguin are concrete, and also many of the private dwellings in that town. This method of building has been practiced during many years in some parts of the Northern and Western States, and is said to be cheaper than stone obtained from the quarry when a suitable mixture of sand and pebbles is close at hand. We have seen few portions of Texas which do not either contain an abundance of good material suitable for concrete walls, or instead rocks well adapted for the construction of buildings, both of which methods are so much better, more lasting and less liable to be destroyed by fire than wood; that whenever practicable all should adopt one or the other of these methods of building. Besides such buildings are the coolest in summer and warmest in winter. If their walls be all made solid, as they should be, there will then be but a few places about the house for rats, mice and insects, which are so troublesome, and detract so much from the comfort of many residents of wooden houses. Washington county contains some fine quarries. A few miles north from Independence, on the Yegua, are the quarries from which the walls of Baylor University and some of the private buildings in that town were made. They afford light grey calcareous sandstones composed of crystaline angular grains of lime with some quartz; the whole finely cemented with a white calcareous paste. These rocks seem to be durable, dress easily, and occur in beds from six inches to two feet thick. The Yegua hills are here from thirty to fifty feet high, which give good exposures of these sandstones. They contain impressions of leaves, some of which resemble the willow and others, those of the live oaks, which are now common in that neighborh od. Although we made diligent search we did not succeed in finding any other fossils at this locality.

Since writing the preceding we find the following in relation to concrete buildings in a number of the Cultivator, an agricultural paper which we have just received:

"All sorts of concrete houses have been and are being built every year in the Northern States. In external finish and beauty, and in comfort and durability, they are not surpassed by any style of dwellings. But the strongest argument in favor of the concrete is its cheapness compared with other materials. Not only is the first cost much less, but it requires no repairs or painting. One mechanic is enough to superintend the work. In a house 50 by 30 feet three men would raise one foot in a day and probably more. That would be 27 days for the first story The remainder could be carried up to plates in 18 days. The labor on the walls would thus amount to $228. Allow $5 for plastering the first coat, $15 for the second, and it will cost $20 for the outside finish. If it be blocked off, and the blocks colored and shaded, there will be $9 additional cost. A bushel of lime will be sufficient for the wash. If the gravel is dug from the cellar, and the stone gathered from the land, there is no expense for that material to be taken into consideration. Several years ago I built of cobble stone a hog house 18 feet square and 10 fees high, the wall being 12 inches thich. Boards were set for the walls as forms, and filled up myself, and boy carrying up the material, and raising the walls two feet a day. We spread a layer of coarse gravel mortar and then a course of cobble stones of all sizes. Two barrels of lime answered for the walls, and plastered the surface one coat. Twice that quantity or more would have been used if the lime and gravel had been pounded into the forms or cast in boxes. From this one will get a pretty good idea of the amount of material used in a house of this capacity. Allowing 720 feet of wall and five days' work for a man and boy, would give 71 feet a day, making an actual cost in labor of $15 for the whole. Two barrels of lime then cost $5. One barrel would be enough to finish the exterior with two coats. Two days' labor would give it all the beauty of appearance requisite to compete with the city mansion. The whole expense would not exceed $30. Let us estimate the expense in concrete blocks of rearing the house 50 by 30 feet. One barrel of lime will make 36 bushels of mortar; one bushel of mortar will make a block 18 by 20 inches, 36 of these will lay 54 feet of wall; 59 times 54 will lay 3,200 feet of wall. One man will mix and cast 100 of the blocks in a day. Fifty barrels of lime will be enough to build the house. From this estimate is to be deducted the windows and doors. One man will lay 50 of the blocks in a day, and allowing 2,100 to the building, would require some 40 days in the work.

It will be seen that the process of packing in stone, as before described, is much the cheapest, and where stones are aceessable, much the best. In casting blocks have smooth boxes, and raise them from the boxes while the mortar is yet soft. No matter about the corners breaking, as all holes can be filled in plastering over the wall. If you pack the stones and morter in the forms you can lay two courses a day in hot dry weather; should rain come the wall will stand an ordinary storm, if covered at the top. If the concrete is poured into boards on the wall you can proceed no faster than the weather will dry it. Concrete is firm in the wind; will furnish surface for 1,000 lbs. of rare grapes every year to be an object of beauty, blending harmony with the surrounding landscape."

Of course the expense of building with concrete varies with the price of labor, and lime, and the convenience of the gravel and stones to the location of the building. We give the preceding extract as an example how it is done in some parts of the North, because we believe it to be the cheapest and best method of building which can be made throughout a very large portion of Texas.

Washington county affords some fine rocks suited for architectural purposes, which are rendered much the more valuable on account of Galveston and Houston; these Washington quarries being the nearest, compact, durable building rocks to those cities which we have yet seen. A little above Dr. Spann's, on the bluffs of the Brazos river, are some hard silicious limestones of a uniform texture which are well adapted for walls. Dr. Spann lives but a few miles above the town of Washington, on the bluffs of the Brazos near Millikin's Ferry. As the railroad is on the opposite side of the river these rocks will have to be hauled but a short distance to the cars. The Yegua hills, north of Long Point in this county, are composed of a light grey calcareous sandstone, which is variable in its texture taken as a whole; some of the specimens being quite coarse and others fine grained. These hills are about two hundred feet above the Yegua river and composed almost entirely of rocks, some of which have been used for mill stones, and most of them are good for building or walls. They contain some fossil wood which abounds in that neighborhood. Assisted by Dr. Lincecum, of Long Point, we measured a fossil or petrified stump, which is between three and four feet in diameter. In the north-western part of the county, not far from the Yegua, on the Sorsby survey, we saw a large number of fossil trees lying along on the ground apparently in the same situations in which they were first prostrated, some as if they had been broken in the fall. We measured some of them which were from thirty to fifty feet long and two to three feet in diameter. They are of exogenous growth, but we have not attempted to ascertain to what genus or genera they belong. The writer measured a fossil stump which is six feet in diameter and six feet four inches long. It is on Indian creek, twenty-five feet beneath the top of the bank, not far from the stage road between La Grange and Bastrop, and half a mile above Mr. McDowels, in Fayette county. This we believe to be much larger than any trees now growing in that neighborhood. This tree or stump, when alive, was larger than it is now without its bark and a portion of the outer wood, and proves that the vegetation a long time ago in Texas was fully equal in size to what it is at present. It is exogenous, and in the Eocene not far from a lignite bed. Fossil wood is prevalent in a large part of the Tertiary, and most of it probably in the Eocene. It is abundant in the north-eastern counties. Many suppose that the process of petrifaction is now progressing. We have been told of live trees which had one side of the trunk petrified, but we never saw one nor do we expect we shall. Lignite beds occur in the Eocene or other tertiary rocks of the state, and some of the beds are so thick and of such good quality as to be valuable for fuel, especially in the manufacture of iron. Mixed with wood and charcoal these tertiary coals burn well. With charcoal they have been used by blacksmiths in Bastrop and other parts of the State. We have seen these lignite beds in Bastrop, Fayette and Brazos counties. They are also quite common in some of the counties on the Trinity river, and on the Red river in the Northern part of the State. Dr. Brown of Prairie Lea, in Caldwell county, informs me that lignite beds exist in that county in connection or near to deposits of iron ore. Some of the lignite beds which we measured on Sandy creek, about three miles from Bastrop in the same county, are five feet thick and of an excellent quality. Below we give an analysis of some of the different forms of coal including lignite. It will be seen that the value of these as a fuel depends on the amount of carbon which they contain.

Anthracite contains Carbon 94.05, Hydrogen 1.75, Oxygen 4.20. According to Regnault, a French chemist, lignite contains Carbon 72.3, Hydrogen 5.3 and Oxygen 22.4. Bituminous coal has Carbon 82.2, Hydrogen 5.5 and Oxygen 12.3, according to Bischof. It will be seen from the above that lignite has only about one-eight less carbon than bituminous coal. However the composition of these different coals is very variable, some of the best lignites being as good as the inferior bituminous coals. We think lignite beds of Texas will yet become very valuable as aids in the manufacture of iron in the State. Their location is such that with the assistance of a comparatively short distance of railroad they can be used in the manufacture of the rich azoic beds of iron ore into metalic iron, for they will probably make as good coke as many of the bituminous coals. Not only can these brown coal beds be thus rendered valuable, but they can also be used as a fuel in Galveston, Houston and other cities and places where wood commands a high price, either mixed with a better quality of coals or with wood. A good analysis of the bituminous coals of the State and also of its lignites, is very much needed; nor do we know of any good reason why it has not been done already.

On Cedar creek, three or four miles from the town of Bastrop, on the west side of the Colorado river, are some large beds of lignite or brown coal. On land belonging to Mr. P. H. Jones, in the north-west corner of the Russan survey, is the following section taken by the writer. Descending:

1	Yellowish sandy loam, - - -	10 feet.
2.	White and yellow sand rock varying in hardness,	7 feet.
3.	Lignite bed, - - - -	8—10 feet

to the bottom of stream, and bottom of coal not seen.

The strata are nearly horizontal.

About one quarter of a mile below this, on the same creek, we obtained the next section:

1.	Surface soil light sandy loam, - -	5 feet.
2.	Sand and gravel with large pebbles, - -	6 feet.
3.	Whitish sand containing a few septaria, the cracks filled with iron, - - -	8 feet.
4.	Blue and black shale with sulphuret of iron and fragments of lignite, - - -	10 feet.
5.	Lignite bed to the bottom, and base not seen,	4 feet.

We traced the length of this bed to the distance of 150 feet. These coals are of a fair quality.

In some of the lignite beds of Fayette and Bastrop counties we found curious specimens of fruits and vegetable impressions, a large portion of which probably belong to undescribed species.

From 1½ to 2 miles farther down on the same creek, on the Lightfoot survey, there is another large lignite bed 80 feet long, where we measured the succeeding section:

1.	Surface soil greyish white sandy loam, -	6 feet.

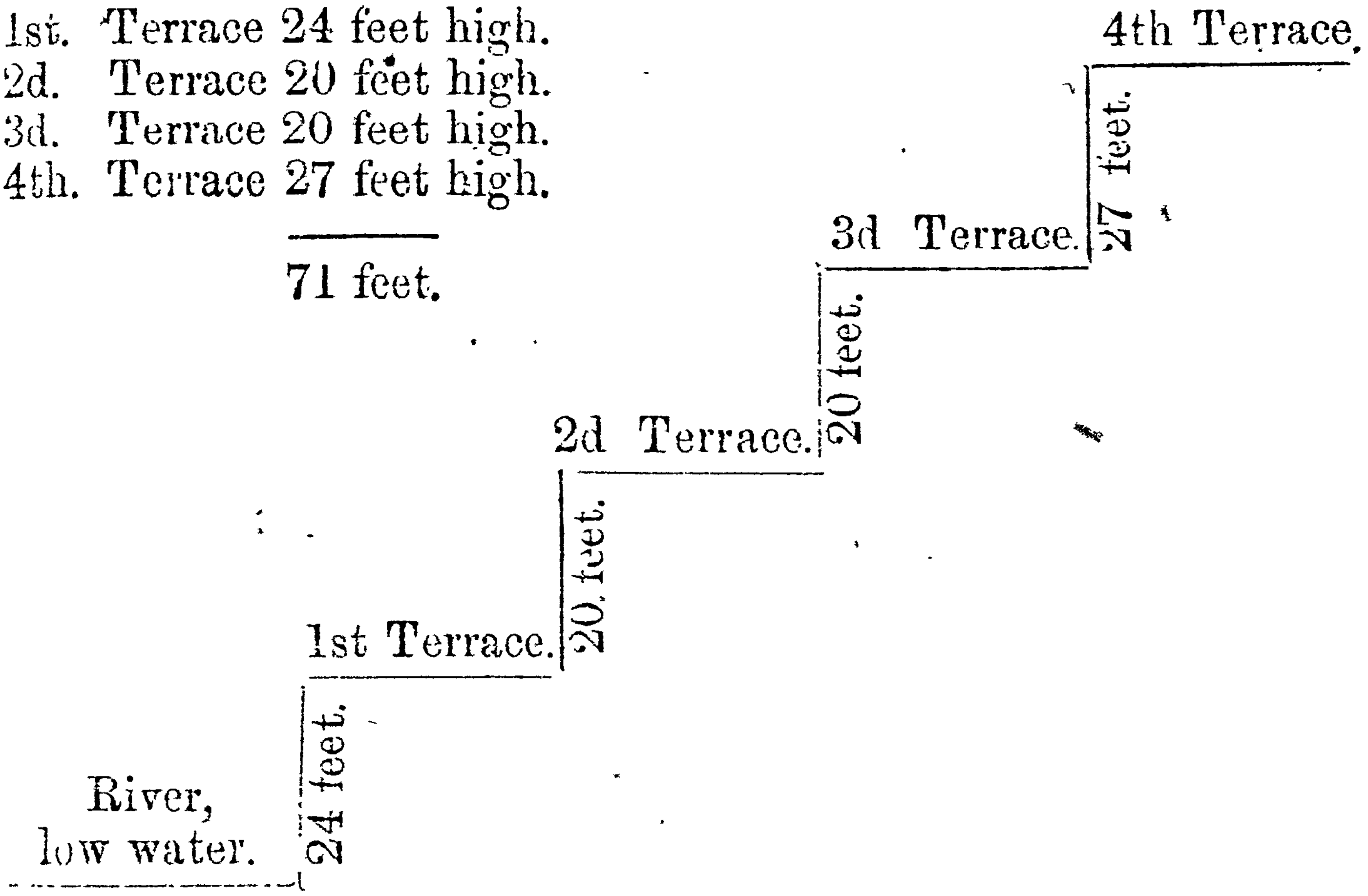
2.	Yellow soft sandstone streaked with white seams,	2 feet.
3.	Coarse brown sand,	5 feet.
4.	Lignite bed containing thin seams of dark blue and pyritous shale,	9 feet.
5.	Blue clay containing large masses of hard iron stone and septaria to bed of stream,	6 feet.

A few rods below this we saw the lignite again in the bed of this stream from which we traced it down the creek to the distance of about three miles. There is a grey, compact, hard sand rock suitable for building in nearly horizontal strata on Cedar creek, opposite the White and McKnight survey. On the west side of Hickory creek and west side of M. Evan's league, is an iron hill embracing about one acre, and about twenty-three feet high, composed of sandy and argillaceous iron ore, some of which is of good quality, and apparently the honey comb variety. The iron rock projects in large masses from the slopes of the hill Some of it consists of iron pebbles cemented with iron, and other varieties have cavities filled with yellow ocre, and sometimes with red oxide of iron. This is the best ore we saw in Bastrop county. The abundance of fuel, both wood and brown coal, (lignites,) and the nearness of railroads renders this a valuable iron deposit. It is true that part of the ore may contain too much sand, but the larger portion is free from this objection. On the south-west corner of the same survey there is a buff septaria limestone containing ostrea and other fossils in large quantities, and in a poor state of preservation. This will form a good line.

At Hill's ferry, on the west side of the river, on Mr. Mahan's land, there is a fine exhibition of the Colorado river terraces, affording the following section of four well marked terraces:

1st. Terrace 24 feet high.
2d. Terrace 20 feet high.
3d. Terrace 20 feet high.
4th. Terrace 27 feet high.

71 feet.



The fourth terrace opens into a prairie (Hill's) which is very beautiful and fertile, covered with plantations which produce fine crops of corn and cotton. This prairie back from the river is bounded by bluffs, mostly sand stones 40 by 50 feet high.

The well of Mr. Wiley Hill in this prairie gives the following section:

1. Dark sandy loam, - - - - - 7 feet.
2. Reddish tough clay with whitish cherty concretions, 10 feet.
3. Bed of coarse gravel and sand, - - - 15 feet.

The wells in this prairie vary from 16 to 40 feet in depth. This very beautiful prairie is 4½ miles long with an average width of two miles. The tops of the surrounding hills are covered with coarse gravel and a growth of post oak.

At the falls of Falls creek, in the north-east corner of Llano county, there are four well defined terraces. They are also common on the Colorado river in San Saba county. They have about the same average height and number, being most often four, but sometimes five terraces at the same locality. They indicate that the elevation of the country from beneath the sea has been gradual.

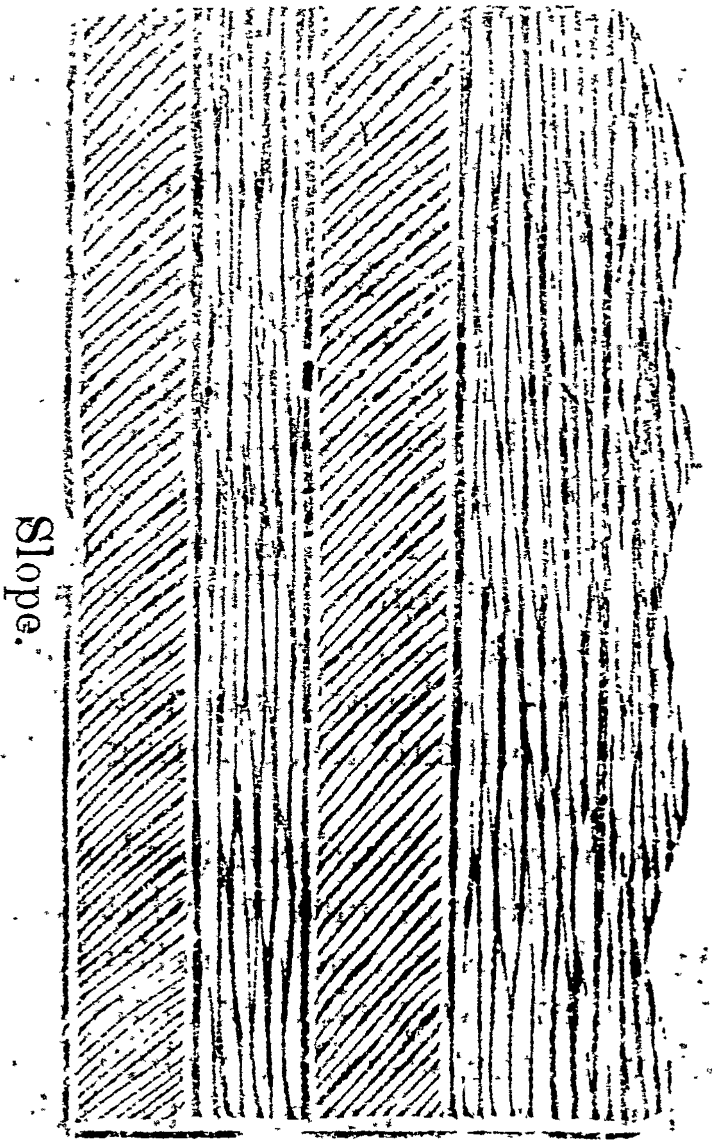
Near the widow Gazley's, below Hardeman's prairie, on the west bank of Colorado river, there is a shell bluff containing a large number of shells, and also shark's teeth, all in a fine state of preservation. Many of the species of shells are the same as those found in the Eocene shell bluff at Claiborne in Alabama, and also in the Jackson Eocene beds of Mississippi, viz: Rostellaria vellata, Caricella subangulata, Mitra dumosa, Clavelithes humerosus, Glossus fillosus, Volutalithes dumosa and many others. About one-fourth of a mile above Mrs. Hardeman's, on the same side of the river, there is another shell bluff where we found a large number of shark's teeth. Although the Eocene of Texas has so many of its fossil shells similar to those of the same formation in Alabama and Mississippi, that no one can doubt but that they belong to the same geological period, yet we have seen no traces of the Zeuglodon in Texas, the bones of which have been found in such great numbers in the Eocene of Alabama, Mississippi, Georgia and South Carolina. This was a huge cretacean about 70 feet long, of which a large portion of the skeleton of a single individual was obtained by the writer many years ago in Clark county, Alabama. The bluffs on the Colorado river, in Fayette county of this State, have a great resemblance to those at Suggsville in Alabama, which contain the bones of the Zeuglodon, hence we expect that the remains of this great Mammal of a former age will yet be found in Texas. The bones of the Mastodon Mammoth and other large quadrupeds have been found in various parts of the State. On the banks of the Brazos river, near San Felipe, in Austin county, almost the entire skeleton of a Mastodon was found many years ago mixed with other large bones. They were taken to New Orleans for exhibition, and are said to have been destroyed by a fire in that city. Still higher up the Brazos, at Hidalgo Falls, in Washington county, similar bones have been found, a large collection of which is now in the possession of Doctors Rucker and Le Grand of the town of Washington in that county. We hope their collection will yet form a part of the State Cabinet at Austin, or some other public institution in Texas. Most of these bones were obtained in the west bank of the river, of which we give a section below. Others were found in the bed of the river at low water after having been washed from the banks above during freshets.

No. 1. At bottom, (ascending,) grey, yellow and greenish argillo-calcareous sandstone alternating with bands of clay, - - - - - 5 feet.
No. 2. Bed of pebbles of flint, limestone and fossil wood, imbedded near the top of which all the bones seen in situ have been found partially exposed after freshets, - - - - 2—3 feet.

No. 3. Loose fine sand, reddish and sometimes yellowish, composed of crystalline grains of quartz and lime, - - - - - - - 21 feet.
No. 4. Variegated reddish and grey loam somewhat indurated, - - - - - - 6 feet.
No. 5. Grey sandy soil and subsoil, - - 5 feet.

Nos. 3, 4 and 5 form a perpendicular wall or bluff. The pebbles are often converted into conglomerate by an iron cement. The fall of the river here is about 11½ feet in the distance of 600 yards, being merely rapids over whose rocks a person can walk dry shod in time of low water. It is a fine place to collect fresh water shells (Unios and others) affording a great variety.

On the east side of the Hidalgo Falls we had a good example of a modern deposit of sand and small gravel, which, when indurated, would show rocks dipping at large angles, alternating with those in horizontal layers, but all deposited by river currents at different stages of the waters.



Five feet high.

There was a slope at the bottom of three or four feet to the water's edge, it being then low water. The section extended several rods along the river, and may have been washed away by the next freshet, or other deposits may have been added to it, and it may remain permanent until hardened and cemented into rock.

In going up and down the Mississippi river during times of freshets, we have seen sand banks partly washed away, which, if indurated, would show contorted rocks or strata dipping at various angles, all formed by eddies and little whirlpools in the river.

At depths of from 10 to 40 feet throughout a large portion of the east part of Washington county, in sinking wells, a whitish sandstone or silicious limestone is struck, containing fossil bones which on exposure to the air often crumble to pieces, hence we succeeded in obtaining but few of them, excepting teeth which are less liable to decay. Such of these as were placed in the State Cabinet are now gone, having been taken away, excepting a few obtained from a deep cut in the railroad near Brenham, which remain yet undetermined.

The soil of Washington county is mostly a dark rich calcareous loam of great depth, sometimes five or six feet, affording large yields of cotton and corn, which are the staple productions. This county was one of those first settled, and is now one of the richest and best agricultural counties in the State. We found no fossil shells in situ in the rocks of this county, except in one or two places a few miles west of Union Hill, on the road to Bastrop, where in sandrock, on a small ravine, there is a bivalve which is rather rare, a Meretrix of undetermined species. On the banks of Yegua, in the western part of the county, are several beds of Eocene shells similar to those found farther westward in Bastrop county. In the hills of the west part of Washington county are numerous crystals of selenite, a form of gypsum or sulphate of lime, which also abounds in several places in Bastrop county. This great fertilizer undoubtedly contributes much towards rendering the soils of these counties so remarkably fertile.

At Damon's Mound, near the north-west corner of Brazoria county, in the southern part of the State, there is a large deposit of carbonite of lime, abounding in beautiful crystals of calcite and also in those of arragonite. We saw the same formation in Live Oak county, near the county seat, in bluffs along the banks of streams. At this last place there is also some gypsum or sulphate of lime. The rocks from both these localities have been burnt for lime, and are said to afford that of the first quality. It is said to be at other places on nearly a straight line between these two localities, forming a low ridge about fifty miles from the coast.

Along the Southern border of the valley of the Yegua are extensive beds of clay so white and pure that it resembles chalk. It is, however, nearly destitute of lime, being a silicate of allumina, and very similar in its chemical composition to the white clay of the so-called "chalk bluffs" in Hickman county, Kentucky, on the banks of the Mississippi river. It is also similar in its composition to a white alluminous earth in Missouri, below Cape Girardeau, which is also on the Mississippi, from which a self-glazing and very beautiful ware is made. There is a bed of clay less white but similar in composition to the Yegua chalk bluffs beneath some gravel beds in a small ravine near Hempstead, in Austin county, from which a fine article of pottery is manufactured. The Hempstead clay is from four to five feet thick, and is less hard than that on the Yegua, the latter having about the hardness of common chalk. These clays are in beds of from four to five feet thick, and varying in color from a light grey to a nearly pure white, occur in many places in Brazos, Washington and Austin counties. They promise to be equally as valuable as those in the Western States, from which a beautiful white ware is made in Cincinnati and other places.

The following analysis of the clays was made by Dr. Riddell, chemist of the survey:

1st. Hempstead clay:

Water, - -	9.148
Sillicate of Allumina,	88 626
Oxide of Iron, -	0.650
Carbonate of Lime,	0.720
Magnesia, - -	9.778
	92.922

2d. Bed of white clay in Brazos county, 10 miles below Boonville, in a deep cut of the railroad:

Moisture and volatile matters, - - - -	12.049
Silica and insoluble silicate, - -	65.435
Allumina with trace of iron, - - -	14.970
Silicate of Lime, - - - - -	6.095
Carbonate of Lime, a trace, - - -	0. 0
Magnesia, - - - - - -	2.150
	100.699

From the chalk bluffs on the Yegua, about 8 miles west of Dr. Lincecums, at Long Point, Washington county:

Mixture and matters volatile perignition, -	12.1495
Silica and insoluble silicate, - -	67.5355
Allumina (soluble with trace of oxide firo,) -	13.8600
Silicate and carbonate of lime, mostly the former,	5.0691
Magnesia, - - - - - -	1.0199
	99.6340

The large proportion of lime and allumina in these clays indicate that they may be liable to fuse at a very high temperature. This may possibly be remedied by mixing a larger proportion of silicious material with them, and by regulating the temperature with great caution during the process of glazing.

Climate exercises an important influence upon the health and enjoyments of the inhabitants of a country; but the agriculturist, owing to its effects upon the growth of plants, has a deeper interest in its results, whether favorable or unfavorable, than any other class of people. Droughts may injure or destroy his crops; too much rain may do the same. The intelligent farmer strives to guard against these dangers, and he often succeeds when others fail, and perhaps have to buy grain. This we saw verified in the dry season of 1860, when one planter would have corn to sell, and his neighbor would have it to buy; the former ploughed deep and planted early, the latter ploughed shallow and planted late. The amount of time and labor given to these experiments by these individuals was nearly the same, but the one was successful and the other not; for farming, like chemistry, is an experimental science.

The amount of rain which falls in even the dry climate of Western Texas is amply sufficient, if rightly used, to make good crops of wheat, barley, rye, oats and early corn. Where there is a good subsoil, we suggest that the ground should be ploughed in early winter that it may imbibe all the rains, a large portion of which frequently runs off from a hard surface. Where the ground is inclined, the furrows should be made to run around the hill, or in an opposite direction from the inclination that the water of the rains may not run and wash out deep gutters. The ground should be ploughed again, previous to planting, still deeper with two or more horses. Plant early if in corn, and should it be sometimes killed by the frost, it can be planted again; but some seasons it will not be killed by the frosts, and then the gains will much more than repay the expense of the replanting of the frosty seasons. We have known corn, when two and three inches high, to be killed down by frost, and spring up again apparently little injured. Early Northern corn thus cultivated is pretty sure to give a good return, and the large Southern corn will often succeed. Wheat, rye, oats and barley arrive at maturity before the droughts of summer come, and hence they generally give good crops in Western Texas.

Sets of instruments belonging to the survey were placed in the hands of Mr. Swante Palm, at Austin, and of Prof. Forshey, at Rutersville, for meterological observations. We have had access to those made by Mr. Palm, from which we have condensed those credited to him below. Those made by Prof. Forshey are from the Texas Almanac for 1860.

AMOUNT OF RAIN AT AUSTIN BY SWANTE PALM.

1859.		1860.		1861.	
	inches		inches		inches
January	1 50	January	2 25	January	1 96
February	68	February	4 48	February	1 10
March	1 70	March	37	March	50
April	42	April	1 86	April	1 44
May	2 46	May	0	May	6 06
June	2 35	June	58	June	1 04
July	89	July	0		
August	82	August	12 99	Amount	12 98
September	9 00	September	74		
October	4 54	October	20	wanting	
November	26	November	5 41		
December	98	December	12		
Amount	25 60	Amount	29 00		

1862.		1863.		1864.	
	inches		inches		inches
January	19	January	5 94	January	0
February	1 44	February	6 26	February	3 30
March	1 94	March	0	March	2 40
April	3 48	April	86	April	2 92
May	4 80	May	2 56	May	78
June	0	June	2 08	June	4 56
July	42	July	2 32	July	26
August	3 44	August	1 38	August	86
September	1 54	September	70	September	1 10
October	2 92	October	5 86	October	3 04
November	12	November	84	November	2 36
December	74	December	1 84	December	1 72
Amount	20.84	Amount	29,74	Amount	23.34

In 1856 the amount, according to the same observer, was - - - - - 37 60 inches.

BELOW WE GIVE THE MEAN TEMPERATURE AND AMOUNT FOR EACH MONTH, KEPT BY E. D. TOWNES, 15 MILES EAST OF AUSTIN.

By Prof. Forshey.			1856.		1857.		1858.		
	deg. min. sec						6 A. M.	2 P. M.	
Lat.	29 58 2		temp	rain	temp	rain	time	time	rain
Lon.	96 46	Jan.	39 75	6 10	42 67	1 00	44	58	2 13
Am't	rain	Feb.	47 2	1 75	60 83	4 00	43	61	1 00
	1858	Mar.	56 33	4 00	61 33	2 25	55	65	7 87
Jan.	6 00	Ap'l	70 83	2 00	58 83	0 87	58	76	0 69
Feb.	3 10	May	72 00	2 50	70 45	2 50	67	80	6 76
Mar.	4 25	J'ne	79 08	1 25	77 28	1 25	68	83	0 50
Ap'l	0	Ju'y	83 17	0 50	80 27	3 37	74	91	0 90
May	5 70	Aug	83 10	0 62	84 10	2 12	71	93	0 50
June	6 39	Sep.	71 77	3 00	75 27	6 00	65	85	4 50
July	1 00	Oct.	66 80	3 00	65 80	2 87	64	87	4 75
Aug.	0 50	Nov	57 20	0 0	62 06	6 37	40	61	1 00
Sep.	0 50	Dec.	47 60	0 50	50 40	6 00	53	57	2 13
Oct.	3 70								
Nov.	2 20	An'l		26.34	65.77	38.60	60.17	74.75	32.73
Dec.	3 40	mean	64.73						
Am't	37.75	Mean annual temperature for three years 65.31							

AT WASHINGTON, IN WASHINGTON COUNTY, OBSERVER MAJOR RUCKER.

	1858. rain inches	1858. inches
January	3 95	2 74
February	1 25	00
March	4 76	4 77
April	1 00	40
May	7 82	1 30
June	2 27	5 00
July	43	2 04
August	1 88½	1 87
September	0 0	7 15
October	3 44	1 74
November	1 63½	00
December	3 34	00
	31.76	27.01

EXTRACTS FROM A METEOROLOGICAL JOURNAL KEPT AT LONG POINT, WASHINGTON COUNTY, BY DR. GEDEON LINCECUM, SR.

	am't rain inches.	dur'g winter coldest day.	dur'g winter warm'st day.	during hottest day	summer coolest day.
1859.	$33\frac{3}{8}$	7 Dec. 8°	16 Feb. 80°	11 Aug. 98°	20 Aug. 72°
1860.	$29\frac{7}{8}$	2 Jan. 22°	25 Jan. 76°	7 July. 107°	18 July 72°
1861.	$43\frac{1}{2}$	4 Jan. 22°	7 Jan. 80°	4 Aug. 99°	17 Aug. 70°
1862.	$31\frac{3}{4}$	12 Jan. 25°	11 Jan. 86°	1 June 105°	10 Aug. 70°
1863.	$37\frac{1}{2}$	17 Jan. 20°	8 Jan. 77°	27 Aug. 97°	26 Aug. 62°

The Doctor remarks that 1861 was only about an average crop year. The average amount of rain for the five years at his place was 35.02 inches. In 1861 there were 24 northers, 99 rainy days, and 6 icy mornings.

The annual average fall in the States, east of the Mississippi river, is 44 inches, while in Europe it is only 32.

According to the report of the Regents of the University the annual fall of rain and snow in the State of New York, during the ten years preceding 1846, averaged 34.14 inches. In the same period the greatest fall in any one year was 37.04 inches, and the least 32.10 inches.

In the temperate zone of the United States the annual quantity is about 37 inches; the amount being greatest on the lower Mississippi, where the average for six years, at Baton Rouge, Louisiana, was 62.10 inches, and at New Orleans, for the same period of time 60.90 inches. At Jefferson Barracks, Missouri, the average for 15 years was 41.95. We have no records of the annual amount of rain in Texas, east of the Trinity, but think it cannot be much less than 36 inches, judging from the size of the timber and the crops of that section, from which we rarely hear of vegetation suffering for the want of rain. At San Antonio, for two years, the average fall was 33.77 inches, and at Fort Belknap, for the same period of time, it was only 22 inches.

The annual quantity in the temperate zone of the old continent is 31.75 inches according to the Physical Geography of Mrs. Sommerville; and the same author gives the annual fall in tropical America as 115 inches, and that of the same latitude in the old world as 76 inches. A record kept at Rivas' Nicaraugua, in Central America, gives the amount of rain for one year as 97.71 inches. Much depends upon the time of the rain. In 1860 the amount at Austin was 29 inches, sufficient for crops had part of it fell during the months of May and June, but during the whole of May, June and July there was only 58 or little more than half an inch, hence there was short crops of cotton and corn throughout Central Texas, north of Fayette county, during that season, and even many of the fruit trees were killed by the excessive drought of these months, but in the succeeding month of August there fell 12.99, or about 13 inches, and nearly all within two or three days, causing many rivers and streams to overflow their banks and do considerable damage.

Texas, west of the Trinity river, has a peculiar climate, different from that of any other country in the same latitude, being subject to greater extremes of cold during winter than those portions of Louisiana in the vicinity of the Mississippi river, and the other States eastward to the Atlantic in the same latitude. These extremes of cold prevail during "northers," which are winds from the North, or North-west, generally preceded by still warm weather, when the thermometer may be at from 70° to 80° F., and in the next one to three hours below the freezing point. These winds occur in North-western Louisiana and throughout Texas, as far westward as the Pecos river. They have less force in the timbered region of Eastern Texas, their greatest power in the prairie country of Northern and Central Texas, and diminish in intensity westward. Their duration is from one to four days, but they seldom last more than three days. They are generally dry and very cold, (seemingly,) which is felt the more keenly on account of the previous warm weather, for only few of them comparatively cause the thermometer to fall below the freezing point. In Austin the thermometer is seldom below 32°, or the freezing point, yet a winter rarely passes without some three or four days' of cold ranging from 20 to 32 degrees. We have northers from November to April, and also during the months of October and April we have cool north winds, but very rarely cold enough to be termed true northers. The frequency of these is seldom more than three in a mouth, and often not more than one or two, and they are very seldom so cold and unpleasant as to make people keep within doors and hinder them from their ordinary avocations. Nor are they unhealthy to consumptives. This is because they are so dry. Consumption rarely originates in Texas, and the western portion of this State is probably more favorable to those suffering from diseased lungs than any other part of the United States Here there is a pure dry atmosphere, and a climate warm enough to permit the invalid to take frequent exercise in the open air amid charming variegated scenery and bright sparkling waters, large springs and clear streams.

The diversity of climate peculiar to this State, and also its varied geology, causing much difference of soil, renders it suited to the growth of most of the vegetable products of temperate climates, and in addition many of those peculiar to tropical regions. This surely is a great advantage which as yet is not appreciated or valued as much as it should be, either at the South or North. If our lands will grow as much wheat, rye, corn, barley, oats, sorghum, and whatever else they may cultivate in New York, Pennsylvania and Ohio, as theirs, our lands would be equally valuable, provided, we had as good a climate and market as they. They have a better market than we, better because it costs less to have it available; in other respects our lands exceed theirs in value, because they are not only equally fertile, and will produce as much of their products as theirs, but will also grow cotton and many other things, which they cannot mature; besides our winters are so mild that little or no fodder is required for stock.

The expense of food and shelter for the animals and the taking care of them during the winter, is a large item which lessens the profits of the Northern farmer sometimes one-half or more. Expensive barns and other buildings must be made, to all of which must be added much trouble from unfavorable weather and bad servants, to most of which the Texan stock grower is a stranger. Yet farmers in the Northern States keep sheep, cattle and horses on lands valued at from fifty to one hundred and fifty dollars per acre, and make money in the business.

In Dallas and other Northern counties of Texas, wheat from ten to forty bushels per acre is raised. The latter amount is said to be a not uncommon crop. The grain is excellent, with a full kernel often weighing 62 or 63 pounds to the measured bushel, and making flour equal to the best Northern wheat, taking everything into account, for many of the mills in Texas can be much improved. The wheat crop of Texas in 1860 amounted to 1,464,273 bushels, while the crop of Illinois, the greatest wheat-growing State in the Union, was 24,159,500 bushels the same year, according to the Census Report of 1860, to which we are indebted for the following statistical information in regard to the amount of the agricultural productions of this and other States.

Bread made from unbolted flour is now used to a large extent in many parts of Europe and America. The amount of nutriment in flour is in proportion to the gluten which it contains. Chemical research proves that the bran or outer husk has more gluten than the fine flour separated from it by the mill.

The whole grain contains - - - -	12 per cent.
Whole bran, (outer and inner skins), -	14 to 18 per cent.

Fine Flour, - - - - - 10 per cent.

According to Johnston, from whose "Chemistry of Common Life" we extract the following:

"If the grain, as a whole, contain more than twelve per cent. of gluten, the bran and flour will also contain more than is above represented and in a like proportion. The *whole meal* obtained by simply grinding the grain is equally nutritious with the grain itself. By sifting out the bran we render the meal less nutritious, weight for weight; and when we consider that the bran is rarely less and is sometimes considerably more than one-fourth of the whole weight of the grain, we must see that the total separation of the covering of the grain causes much waste of wholesome useful food. Bread made from the whole meal is therefore more nutritious; and as many persons find it also a more salutary food than white bread, it ought to be more generally prefered and used. The gluten of the husk resides chiefly in the inner covering of the grain. Hence the outer covering may be removed without sensible loss of nutriment, leaving the remainder both more nutritious than before, weight for weight, and also more digestible than when the thin outer covering is left upon the grain. An ingenious American instrument has been patented by which the removal of the outer coating is completely effected without injury to the bulk of the grain. It is also a point of some interest that the small or trail grain which the farmer separates before bringing his wheat to market, and usually grinds for his own use, is richer in gluten than the plump full-grown grain, and is therefore more nutritious."

Wheat is grown throughout a large portion of Texas, as far south as San Antonio, and its culture is increasing and expanding. 95,012 bushels of rye were returned as the crop of Texas in 1860, when at the same time Pennsylvania, the greatest grower of rye in the United States, had 5,474,792 bushels. We think this grain is not grown in Texas as much as it should be. It does well wherever the other cereals will grow, and seems less liable to the attacks of insects than wheat. It makes an excellent bread, which is prefered by some to wheat, yet there seems to be a prejudice against it in the minds of some, mostly caused, we think, on account of its dark color. The composition of the two is nearly the same according to Johnston.

	WHEAT BREAD.	RYE BREAD.
Water,	48	48½
Gluten,	5¾	5⅓
Starch, &c.,	46¼	46 1-6
	100	100

Hence rye bread has about an equal amount of nutritive quality to that of wheat, besides it retains moisture, and will keep fresh and soft much longer than wheat bread. Rye like wheat has the larger proportion of gluten in its skin, hence bread made from its unbolted flour is the most nutritious.

Barley, as far as we have seen, does remarkably well wherever wheat will grow in this State. We think it a surer crop than wheat; nor from the growing grain which we have here seen do we think any land will give a greater yield per acre. California is the greatest grower of barley, its crop being, in 1860, 4,307,775 bushels. New York comes next, having the same year 4,186,667 bushels, and Texas only 38,905 bushels. The many breweries of our large towns afford a good market for it. It also makes a good bread affording nourishment about equal to that of wheat or rye, but does not yield much bolted flour per bushel on account of its thick skin or husk.

The oat crop of Texas was 988,812 bushels, besides which a large quantity is grown and cut in a half-grown state for fodder. Oats are liable to rust in some sections of the State, but generally give a good yield. The State of New York grows the most of this grain, her crop being 35,175,133 bushels.

Corn is one of the great staples of the State, and is cultivated in all the grain, cotton and sugar-growing regions. It can be made a more certain crop, in those sections liable to drought, by deep ploughing and early planting, as has before been remarked. Early Northern corn thus treated is a very sure crop. In the year before named the crop of Texas was 16,521,593 bushels. As 1859 and 1860 were both unusually dry seasons, it is probable, nay certain, that that amount is much less than the usual yield. Illinois raises more corn than any other State, (115,296,779 bushels,) and so much as to overstock the market of the Northwestern States and render it of little value per bushel. Indian corn contains more oil or fat than any of the preceding named grains, and seems to be more valuable for fattening hogs or cattle than any of them. As food for stock it is also more wholesome on account of the thin skin of its grain, which renders it less liable to injure the alimentary canal. Johnston gives the following composition of the different forms of flour:

	English fine wheat'n flour.	Bran of English wheat.	Scotch oat meal.	Indian corn meal.
Water,	16	13	14	14
Gluten,	10	18	18	12
Fat,	2	6	6	8
Starch, &c.,	72	63	62	66
	100	100	100	100

The preceding table is instructive, showing that bread made from corn meal yields more nutriment than biscuit or bread made from fine wheaten flour. We can also see why oats (a bushel of which weighs so much less than other grains) are, notwithstanding, very nutritious. They seem better suited for horses than any other grain. As is well known, cakes made from oat meal are a common food among the inhabitants of Scotland. We also learn that bran affords more nutriment than is generally supposed, being about equal to oats. We have not seen buckwheat growing in the State, but learn from the last census that Texas in 1860 raised 1,612 bushels. Its cultivation has been recently introduced, as the report for 1850 gives only 59 bushels as the crop of Texas. Pennsylvania produces the most of this grain, viz: 5,572,026 bushels, which is not much more than is annually grown in the State of New York. Hot buckwheat cakes with good honey or syrup are so delicious that we hope the farmers in the Northern part of the State will grow sufficient to supply the Southern demand. We raised 25,750 lbs. of rice in 1860, and South Carolina 119,100,528 lbs. It is less nutritious than is generally supposed, containing only seven or eight per cent. of gluten and but little fatty matter. In some of the work houses of England, where it was substituted for potatoes, it is said to have produced sucrvey. Of sorghum molasses we made in 1860 115,051 gallons, and now probably annually make a much larger amount, as its cultivation is extended into a large portion of the State. Iowa made 1,993,474 gallons, which is more than was made by any other State.

Of hemp, Texas raised ten tons, and Kentucky 35,070 tons. Of hay the State only had cut 11,349 tons, and the State of New York 3,564,786 tons. This shows how little hay is needed for all the stock of Texas during a mild winter. The livery and other stables in towns and cities use most of the hay cut in this State. We are glad to see that Texas raised 449 bushels of clover seed, for its growth is an important addition to our agriculture, especially to stock growers in the north-eastern and eastern counties. We do not think it will thrive in the dry regions. Pennsylvania raised the most, having 274,363 bushels. Besides the clover seed we grow 2,976 bushels of grass seed which argues well for our farmers, because the culture and saving of grass seed has heretofore been almost entirely neglected by the Southern planter, as it is yet in the States of Louisiana, Georgia, Mississippi and Florida, all of which produce less grass seed than Texas. In 1860 there was made in this State 277,512 pounds of cheese and 5,948,611 pounds of butter. The State of New York makes both the most cheese and butter; of the former 48,548,288 pounds, and of the latter 103,097,279 pounds. Texas had 550,708 pounds of honey, and New York 2,369,751 pounds, hence in the empire State, at present, there flows the most milk and honey. Of hops, Texas had 122 tons, and New York 1,655,542 tons. This growth is considered very profitable in New York. Of tobacco, we grow 98 116 pounds, Virginia 123,967,755 pounds and Kentucky 108,102,433 pounds. During the last few years the great profits which can be made in the culture of tobacco, has drawn many farmers in the Northern States into its cultivation. Maryland ranks next to Kentucky, having 38,410,965 lbs. Ohio 25,528.972 lbs., and the little State of Connecticut 6,000,133 lbs., where many of the lands devoted to the culture of tobacco are valued at upwards of one hundred dollars per acre. It is a well established fact that the climate has a marked effect upon the quality and value of this plant, the best being grown in the island of Cuba, as every cigar smoker knows. Next in value are Manilla cigars, from the island of Luzon, one of the Philipines. Much also depends upon the soil, method of culture, kind of manure, manner of preparation, etc., etc., all of which influence its quality; but to give it full perfection a long warm summer is required. We think that Texas has a soil and climate well adapted to the growth of a superior article. Nearly forty species of tobacco have been described by botanists, (we do not know the exact number,) some of which are natives of this State, there being one which is from three to four feet high, with a large leaf, common on the banks of the Colorado at Austin. The Virginia tobacco (Nicotiana tobacum) is that in common cultivation in the United States and Cuba. The amount grown in the United States in 1860 was 429,390,771 lbs. The average is said to be not far from 800 lbs. per acre. The use of tobacco is more universal among mankind than any other vegetable, and next to salt it is supposed by some to be the article most generally used by the human race. In almost every country on the globe it is smoked, chewed or used as a snuff.

It is grown in Europe, Asia, Africa, North and South America. The United States produces more than any one nation, say about one-fifteenth part of the whole amount grown; and American tobacco commands the highest price in the European market. In England the price of the different kinds ranges about as follows:

Canada 4d. a lb.	St. Domingo 8d. a lb.	Cuba 1 s. 6d. a lb.
Kentucky 6d. a lb.	Turkey 9d. a lb.	Havana 3 s. 6d. a lb.
Virginia 7d. a lb.	Columbian 10d. a lb.	
Maryland 9d. a lb.		

We wish to call the attention of the planters of Texas to the above, because we know that the culture is very remunerating, as there are many farmers at the North who have in some instances realized more than fifty dollars per acre above all expenses incurred up to the time of sale. We certainly have a soil equal to the tobacco lands of the North, and a climate better suited to the growth of a superior article. Tobacco is known to be an exhausting crop to the soil. It is composed of about one-fourth inorganic or mineral matter, which is derived from the soil; hence if we grow one ton of tobacco, when we take it from the ground, we also convey away about five hundred pounds of that portion of the soil best relished by the plant, for plants, like animals, thrive best on nourishing food, and also like animals they have their likes and dislikes. What is wholesome food for one is unwholesome for another. Hence a rotation of crops and a varied agriculture well managed always proves the most profitable, and least exhausting to the soil.

We are confident that tobacco (by manuring and pursuing a proper system of rotation of crops,) can be grown without exhausting the soil, and also give good profits in this State.

The crop of cotton of this State, in the years 1859 and '60, was short, on account of the drought; hence only 405,100 bales are reported in 1860, as the entire yield. Mississippi had the most, viz: 1,195,699; Alabama, 997,978 bales; Georgia, 791,840; Louisiana, 722,218; and the total amount in the United States was 5,196,844 bales. The bales are supposed to average about 400 pounds each. J. DeCordova estimated the average weight of an American bale of cotton to be 475 pounds, which we think is too high; that of the East Indian 487 pounds; Egyptian 313 pounds; Brazilian 182 pounds; West Indian 175 pounds. Texas, in 1860, ranked as the fifth State in the amount of cotton; and as there are large areas of unimproved land here, the time is not distant when she will be among the first, if not the very largest, cotton-grower in the Union. The cotton lands on the lower Colorado and Brazos rivers are unsurpassed in the United States for fertility, amount of yield per acre. Taking everything into account, they are the most valuable cotton lands in tha country, not being subject to overflow, like those on the Mississippi and upper Red River, and hence they are not liable to malignant fevers, prevalent on those rivers, arising from malaria. Sea breezes from the Gulf moderate the heats of summer, and there are few cotton sections as healthy as those of Southern Texas. The soil is a dark alluvium, abounding in vegetable matter, containing enough allumina to render it sufficiently tenacious to hold moisture. The silicia lime, and other constituents, finely pulverized, to be easily imbibed and digested by the plant. Sufficient importance is not generally given by agriculturists to this matter. We know that men and the inferior animals obtain the most nutriment from a given quantity of food when it is ground fine. Experiments prove that the different grains ground afford more nourishment to stock than if fed whole; so also do men enjoy better health and receive more strength from food when it is well masticated. So with plants; they grow better in a well pulverized soil, provided that soil contains their proper food, in suitable proportions. Chemical analysis of soils proves this. The lands on the lower Sciota river in Ohio, remarkable for their large growth of corn, of which good crops have been raised in succession yearly on the same land for more than twenty years, with little or no diminution in amount, per acre, are identical, or have almost exactly, the same ingredients as some of the sandy, barren soils of New England; the difference being that in the former the silex is a very fine sand, and in the latter very coarse, so coarse that the plant cannot eat it or digest it. This fact is what renders the deltas of all large rivers so fertile, because they are river deposits, and the waters of these rivers, in their long course, only retain the finer particles of matter in solution, until they near their journey's end, where they are deposited.

We think the average yield per acre of ginned cotton in Fort Bend, Brazoria and Matagorda counties is about 600 pounds. When we were in those counties, some planters told us it was a bale and a half per acre, and that three bales per acre was not an uncommon yield. In one instance an average of over thirteen hundred pounds per acre of ginned cotton was obtained from five acres. All agreed that the hands could cultivate more than they could pick out. The cotton lands in the Northern counties of this State will probably average no more than a bale (450 lbs.) per acre. Those on the upper Red River, near Shreveport, in

Louisiana, are said to average about 500 pounds per acre—that is, on the bottom lands, along the river; but they are unhealthy, and subject to overflow. The best cotton lands of the State of Mississippi, on the Yazoo and on the Mississippi river, only average about 450 pounds of picked cotton per acre. We allude to this to show that Texas has the best and most valuable cotton lands in the entire South.

The long staple, or sea island cotton, has been cultivated to some extent in this State, but we do not know to what amount. A Mr Lea, living near Gonzales, told us that he raised it, and considered it more profitable than any other crop, on account of the high price per pound, and the comparatively little expense of conveying it to a market at Lavaca or Indianola. In the winter of 1858 and '59, the writer was in that portion of South Carolina (on the Santee,) where this cotton is raised, and as near as he could ascertain, the average there was less than 100 pounds per acre; to obtain which, good culture and manuring were necessary. This cotton will grow inland, as far as the sea breezes extend. On the sea islands of the coast of South Carolina and Georgia, the manure most valued for the cotton lands is the sea weed, there thrown in heaps on shore by the waves.

The yield of cane sugar in Texas, as given by the census for 1860, was only 590 hogsheads, of 1000 pounds each. The census being made in 1860, of course gives the amount of the preceding year, when an early frost, such as had never before been known since the culture of sugar began, nearly destroyed the entire crop. In 1849 Texas gave a yield of 7,351 hogsheads, being only second to Louisiana, the largest producer of cane sugar. Louisiana's crop for 1859 was 297,816 hogsheads. The writer spent a few days in January, 1860, with the Hon. Greenville McNeil, at Ellerslie, in Brazoria county, who is said to be one of the best managing sugar planters in Texas. He has from 600 to 700 acres in cane, which has to be planted anew once in three years; but to equalize the work, one-third of the ground is replanted each year. The planting begins from the middle to the last of January, with joints of cane; for this plant never matures its seed either in the United States or Cuba. He plants in drills seven feet apart; but in Louisiana, the distance between the rows is often less by one or two feet. There also a hogshead of 1000 pounds is considered a good yield per acre; but as much as one and a half hogsheads are occasionally made. In Brazoria county, two hogsheads of 1200 pounds each have been made from one acre in one season, the average in good seasons being from 1200 pounds to 1500 pounds per acre. The cane is worked with the plow until the last of July, when its tops meet and shade the ground, so as to prevent the growth of weeds; then the crop is "laid by.' The grinding of cane begins from the 10th to the 20th of November, and lasts until it is time to plow for a new crop. The molasses is considered as generally sufficient to defray the expenses of cultivation. Some suppose that the increased culture of the Sorghum and the abolition of slavery will render the cultivation of the sugar cane unprofitable, and cause many sugar planters to turn their attention to other products. It is true that the sorgham furnishes a large quantity of sweet for the country in molasses and syrups, but three pounds of cane sugar are said to have nearly as much sweetness as five pounds of sorghum sugar. However, as yet, we believe, no sufficiently economical method (to bring it into general use) has been discovered of converting sorghum molasses into sugar, nor does it seem possible to make as palatable a syrup or sugar of it as that made from the cane. The increase of population, the increased consumption of sugars, and the limited quantity of lands in the United States on which the cane can be grown, we think will make its culture as profitable for years to come as it has been years past. The entire product of the United States in 1860 was 302,205 hogsheads, most of which was made in Louisiana. The amount of cane molasses made by Texas in 1859 was 388,937 gallons, which, like the sugar, and from the same cause, is less than the quantity usually made in this State.

Irish potatoes grow well in almost every section, but in the southern portions of the State seed from the north is usually planted in February, which brings new potatoes in May. According to census report of 1860 we raised 168,937 bushels. We also grow peas, beans, squashes, tomatoes, cucumbers, carrots, beets, turnips, okra, cabbage, and other vegetables, and as good watermelons as can be produced elsewhere.

The value of the orchard products of this State in 1860 were $46,802, while in 1850 they were only $12,505. This shows that we have had a large and increased attention given to fruit culture, yet it is very little compared to what Texas can be made to do in the fruit business. Apples grow well, and bear excellent fruit in all the northern and northwestern counties, and when experiment and time shall demonstrate what varieties are best adapted to that region, improvements will be made, and the best kinds grown in sufficient abundance to supply the immediate home and entire State market. Peaches thrive in nearly every section of the State; even the choice northern kinds do well here. By a proper selection of different varieties, early, intermediate and late, we can have this delicious fruit in the vicinity of Austin from the last of June until in October, and by the mtehod of canning, the entire year. The self-sealing can requires but little care in the preparation of the fruit, and the same cans can be used during a succession of years. Instead of bringing canned fruit from the New York market, we should have a surplus to send there. When we have this surplus, we shall have increased our home comforts, besides having an additional source of wealth. Fine nectarines are raised at Austin. Texas seems well suited to the plum, for we have more native species than any other State. In some portions of Eastern Texas the common northern species, (Prunus Americana) grows with little difference in size and appearance from the northern tree.

In the vicinity of Austin we have Prunus Umbellata, which has a strong resemblance to the preceding, in trunk and branches, but is differnt in leaves and fruit; the latter being round, about half an inch in diameter, of a deep purple, or black, when ripe, and very variable in taste; often very sour and astringent, and sometimes of an agreeable acid. It ripens its fruit in July and August. This plum grows also in Georgia, Alabama, and Mississippi, and is sometimes called the sloe. The "Chickisaw Plum," (Prunus chicasa,) is both indigenous, and cultivated in this State. It grows to the height of from 8 to 10 feet, branching often, bush-like from near its base, and bears profusely, the fruit ripening from the last of May to the first of July. We have measured specimens at Austin which were a little more than an inch and a quarter in diameter; juicy, sweet, and good to eat, whether cooked or uncooked. They sold readily in the Austin market at 25 cts., specie, per quart. In the upper central counties of Texas is a shrubby plum, 4 to 8 feet high, (Prunus rivularis,) growing on the banks of streams; its leaves resemble those of the common wild cherry, (Cerasus serrotina,) and its fruit is about half an inch, or an inch, in diameter. It is acid, and somewhat agreeable to the taste, and is cultivated to some extent; it ripens its fruit in July, and bears well. Prunus minutiflora grows in Washington county, and in the counties further west of it, as far as San Antonio. It is a small shrub, growing in clumps from 2 to 3 feet high, and has a small tomentose, peach-shaped fruit, about half an inch in diameter, which is said, when ripe, to be sweet to the taste, but to have little pulp. The plum tree here has few diseases, and in this portion of the State (Austin,) we have seen no black nots, or plum curculios, those destroyers of northern trees and fruit. The cultivation of some of the best northern varieties of plum promises to prove very successful here, only be careful, and let them be grown from the seed, or small healthy stocks be imported. The apricot, which rarely succeeds in ripening its fruit at the north, on account of the curculio, should it do well here, would prove very profitable ; and as it is very similar to the peach and plum, we can see no reason why it would not be a decided success in this portion of Texas.

We have two native cherries, the Cerasus serotina, which is the common black cherry, growing in all the States east of the Mississippi river ; and the Cerasus caroliniana, called in some of the older cotton States, "Mock orange," and in some parts of Texas, the wild peach. It is a beautiful evergreen, growing on rich bottom land, and is cultivated extensively for ornament in the cotton States east of the Mississippi river. It forms a fine ornamental hedge, and can be pruned into various shapes ; its fruit is not edible.

Texas has two native mulberries. Morus rubra ; common in most of the States of the Union, and also common here. In western Texas there is the Morus microphylla, or the small-leaved mulberry, common on limestone hills, growing to the height of from 15 to 25 feet ; it has a black, acid fruit, about the same size as the last species ; it is ripe the last of May, and having been recently discovered by the author, it is not included in our botanies.

Texas has one native blackberry, (Rubus triviclis,) common in nearly every section. It bears very good fruit, is cultivated by some, and ought to be by others, because its fruit improves in flavor, and it also bears more abundantly when cultivated ; it trails, and needs support, and when thus treated, well repays the trouble.

We have two indigenous persimmons ; one of which is common as far north as Pennsylvania ; the other is the Mexican persimmon, Dyaspyrus Mexicana, found in most of the limestone bluffs in the western part of the State. It has a smooth bark, small lance, ovate leaf, and fruit 1 to 1½ inches in diameter, which is black, or purplish black, when ripe, in August ; it is sweet, and relished by some, and by others disliked.

The strawberry has been cultivated, and, with proper care, succeeds pretty well, but it needs irrigating during long droughts. It is indigenous—thrives well in those parts of the State where there is a sufficiency of rain for its wants. Figs are grown in nearly every garden, and bear abundantly ; but there is not sufficient attention given in Texas, or in the other Southern States, to the best varieties of this fruit, which are very numerous in Europe. In the London Horticultural Society's Fruit Catalogue, 89 sorts are enumerated. Most of the dried figs of commerce are from the south of Europe. Choice figs are raised about Marseilles, in France, on the shore of the Mediterranean, in open situations near the sea. The ground is trenched 2 to 3 feet deep, and richly manured, and the trees planted in squares, 12 to 15 feet distant from each other. The trees are kept as low bushes, and never allowed to attain more than 3 or 4 years growth. Those intended for drying, are permitted to remain on the tree until they are dead ripe, when a drop of sweet liquid hangs from the eye. Fowls are said to be fond of figs, and in some parts of France and the Isles of Greece, where they are abundant, they are fed to horses, mules and cattle, all of which are said to thrive on them. Many places on the gulf, in this State. are well adapted to the culture of this fruit. There is another fruit growing in the south of Europe, which ought to be introduced into Texas, the olive, of which we saw a fine tree growing in a garden at Columbia, South Carolina, and also had the pleasure of eating some of its fruit. There is little doubt but that this tree would thrive here.

A few days ago (July 3d, '66,) we received a letter from a French gentleman in Paris, France, inquiring about Texas, and what Frenchmen could do here, as, on account of the impending war in Europe, many wished to come to America. We stated, in reply, among other things, that they could raise fruit ; and in addition to the preceding, they can also grow grapes, for which this State possesses peculiar advantages, there being at least seven species indigenous here, besides others from abroad in cultivation ; of these, the mustang grape, (vitis mustangeusis,) is the most widely diffused, and the most abundant. It grows throughout most of the State, excepting some parts of Eastern Texas, and perhaps a part of North-western Texas ; it attains a large size, sometimes almost completely overspreading the largest trees, and is readily known by its leaves, which are of a deep green above, and white and tomentose beneath, besides its fruit has very distinctive characters ; it has a large black fruit, sometimes nearly an inch in diameter, and clusters of a moderate size , it is little esteemed for eating, on account of an acid juice in the inner cuticle of the skin, which, if swallowed, gives a burning pain in the throat ; still, the pulp is quite palatable, and wholesome if squeezed out, and eaten without the skin. It makes, what we think to be, an excellent red wine, which, by age, attains strength and flavor.

The Lincecum grape (Vitis Lincecumii) grows in Eastern

Texas and in the eastern parts of the central portion of the State in postoak openings, whence it is often called the "postoak grape." It is of low habit and slender form, growing in clumps or climbing over small trees and bushes to the height of from 4 to 10 feet. It has larger leaves than any other species of American grape, and has large clusters of thin skinned, purple berries about three-fourths of an inch in diameter, which are juicy and of a pleasant acid taste. Fruit ripens the last of June and the first of July. It is well worthy of cultivation, being certainly good for table use. and it ought to be tested as a wine grape.

The Mountain grape (Vitis Monticola) is of similar habit to the last, being seldom more than ten feet high. It has small cordate leaves of a pale green color, which are smooth above and more or less pubescent beneath, especially along the nerves. Its clusters are rather densely fruited with white or amber-colored berries, one-half or three-quarters of an inch in diameter, thin skinned, which are ripe in July and August. It is said to be sweet-tasted and of a very agreeable flavor. It is sparingly cultivated, being as yet little known. Specimens of it with unripe fruit are in the collection at the geological rooms; and they have a strong resemblance to those of the winter grape, from which it is distinguished by its fruit and difference in time of ripening, its smaller leaves and its smaller size throughout.

Mr. Lindheimer, a well known German botanist of New Braunfels, who has done much to elucidate the botany of Texas, and who first brought the next species into notice, also first called our attention to this grape, which, with the two preceding species we first described in the Proceedings of the Academy of Natural Sciences of Philadelphia for 1861

Mr. Durand, a French botanist, in describing the Mustang grape in 1862, gives it the name of "Vitis candicans," supposing it had been previously described by Dr. Engleman under that name. This is a mistake. Dr. Engleman never published any description of the mustang grape, nor was any botanical description ever published of it previous to ours in 1861.

The Rock grape (V. rupestris) grows along the borders of rocky streams in North-western Texas. Its leaves are small, smooth and shining above and below, of a deep green, and coarsely toothed. Its branches are rather stiff and erect, three to four feet high, seldom trailing, but often growing like raspberries and blackberries in thick clusters of nearly vertical stems. It has small clusters of densely placed blackberries about one-half an inch in diameter. Its fruit is said to be thin skinned, slightly acid and good. Its leaves resemble those of the muscadine grape. The other grapes growing wild in Texas, being also found in many of the States east of the Mississippi, are well known.

The winter grape (V. cordifolia) is common in Central and Eastern Texas, and is next to the mustang the most widely diffused.

The Muscadine or Bullace grape (V. vulpina) is confined to the southern and south-eastern counties, extending in Central Texas as far north as Washington county. It is called scuppernong in the eastern part of North Carolina, where it is much cultivated for making wine.

The returns of wine made in this State in 1859 are 13,946 gallons, most of which, we suppose, was made from the mustang grape, except perhaps a few gallons made from the El Paso grape on the Rio Grande. Ohio made at the same time the largest number of gallons—562,640, aud California next, viz: 494,516 gallons. The total amount produced in the United States was 1,850,819 gallons, while in 1850 it was only 218,023, which is less than half the amount now made in the single State of California, which has a climate similar to that of Central and Western Texas in the dry region. The growth of the grape proves so profitable that it is how receiving general attention in Ohio, New York and other Northern States, where poor side-hill lands suited to the grape, were sold last season at two hundred dollars per acre, without buildings and under poor fence; and lands with bearing vines were valued at 1,000 dollars per acre. We saw five acres of grapes at Naples, in Ontario county, in Western New York, last September, the fruit of which was sold on the vines at $3,000, the buyer being at the expense of picking. This was on a gravelly side hill, and the vines had received no manure, which a few years since was considered so essential to their cultivation in that section. There is no danger of overdoing the business, for we now annually import millions of gallons of wine from Europe, a large portion of which is impure and adulterated, at least everybody seems to think so; hence good American wines command the highest price in the markets of our Northern cities, with perhaps the exception of champagne and some other choice kinds. A loamy clay soil in a limestone section, is the best soil for the vine, according to the experience of the best Ohio wine makers, where the Catawba is the principal grape cultviated. Hill sides and gentle slopes are prefered, because on such soils underdraning is unnecessary. Such places and soils are also prefered in the State of New York, where the Isabella takes the place of the Catawba as a wine grape. Grapes which have less than 15 per cent. of saccharine matter require sugar or alcoholic spirit to be added to the wine made from them in order to have it good, and even grow better by age.

Below we give the analysis of some American grapes made by Charles F. Jackson. We regret that we cannot include all species of the grapes of Texas in the list :

	Juice p. lb. fluid oun's	Specific gravity	P. cent. saccharine matter	Grape sugar	Alcohol
Catawba,	11	1.0751	17.5	21.3	10.65
Isabella,	11½	1.0640	16	14.7	7.03
Fox grape, (vitis labrusca,)	12	1.0510	13	15	7.5
Vitis acstavalis,	11½	1.0530	13	8.97	4.48
Wintergrape, (v. cordifolia)	10½	1.0360	9	6.2	3.1
Scuppernong, (v. vulpina,)	8	1.0480	12	9.8	4.9
Clinton,	11	1.0880	22	20.5	10.25
Concord,	12	1.0550	13.5	11.8	5.9

It is customary to add a certain proportion of water and sugar to the grape juice to overcome the acids and render the wine more agreeable. The sugar is converted into alcohol and gradually precipitates part of the tartaric acid as bi-tartrate of potassa or cream of tartar. It has been supposed by some that American grapes did not contain a sufficient portion of Tartaric acid to make wines equal to those of Europe, but chemical analysis proves the contrary, and also shows us that if there be any lack of this ingredient it can be supplied by adding cream of tartar. Tartaric acid is peculiar to grapes, giving them their sourness or acidity. It is so called because it is extracted from the tartar or crust deposited on the sides of casks or bottles of old wine, and this is why wines lose a portion of their acidity and improve by age in taste and flavor. This odor arises from a substance called œnanthic ether, which does not exist in the juice of the grape previous to its fermentation, but of which it is a product. It only exists in a very small quantity in grape wines, and, joined with other fragrant substances, found in a greater or less quantity in them, is the cause of their peculiar scent or *bouquet* so well known to good judges of wine.

Aided by chemistry and experiments the winemakers of Germany and France have recently made great improvements in their business. The following proportions in 1,000 pounds of grape juice are adopted as a standard in those countries as forming the best wines :

Sugar,	240 pounds.
Free acids,	6 pounds.
Water,	754 pounds.
	1,000

That is the analysis of the best wine making grapes, affords about those proportions. To ascertain the actual proportions of sugar and acids in the must or grape juice, they have two instruments, a must scale and an acidimeter, and if the juice does not contain the proper quantity of sugar or acid, it is added. For making wine, grape sugar is the best, but if this cannot be obtained the best white cane sugar should be used. We suggest that some of our Texan winemakers try the experiment of substituting sorghum molasses for cane sugar on a limited scale in the manufacture of wine.

We have dwelt somewhat upon grapes and fruit culture, because we think it will soon become a leading business of many people in this State, for as great profits can be realized in this business on a few acres as on many with the continual expense of many servants incidental to the culture of cotton, sugar, tobacco, or the different grains. The culture of fruit gives pleasure to the eye, and health to the body The blossoms, the growing and the ripe fruit delight the sight and afford a wholesome food, and if well pursued as a business the surplus sold forms a good income.

Were it not for the thieving Indians, Texas would raise more horses than any other State; but as most of the depredations of the Indians on the frontiers are for the purpose of stealing horses, the business of raising the latter and permitting them to roam at will on the prairies, has much restricted the number in the State. According to the last census it was 320,621, and mules 63,000. Ohio is the greatest producer of horses, having 622,-829. Tennessee raises the most mules, viz : 119,221. Kentucky having nearly two thousand less.

Texas takes the lead in cattle and also in working oxen, having 2,733,267 of the former, and of the latter 172,243, and of milch cows 598,086. New York, being a great dairy State, has the most of these last, viz : 1,123,634. Little attention has been given to the improved breeds of stock. A general impression prevailing that they will not do well roaming at large over the hills and prairies where the whole country is unfenced, excepting a few fields, perhaps, to raise grain for family use. It is not uncommon for some persons to own three thousand or four thousand head of cattle. Each person has a peculiar registered brand or mark, which is stamped or rather burnt into the skin of the calf, after which it may roam until sold to some drover passing through the country. Part of the calves are kept in a yard at home to which the mother cows return in the evening, to spend the night with their offspring and yield milk for family use. Several owners of ranches told us that their annual profits were from 25 to 50 per cent. on their investments in the cattle business.

The number of sheep reported in 1860 as being in Texas was 783,618. Ohio had the most sheep in 1860—3,063,887, which is however less than the amount she had in 1850. The total number of sheep in the United States, as reported in 1860, was 22,431,428. Some cattle keepers are unfriendly to sheep, thinking they eat the grass so close as to kill it. This may be so when the land is overstocked with them, not otherwise, according to the testimony of wool growers, which also agrees with our observations in those sections where sheep are kept. Mr. Kendall, who is one of the largest and most successful wool growers in the State, has one hundred or more acres in fence from which he cuts some hay, after which the grass on the mown land attains a good growth for winter pasturage. Within this enclosure shelters are also provided. This is the sheep hospital where the lame, poor, weakly sheep are placed as soon as they show signs of want of vigor. The result is that he rarely loses a sheep out of many thousands. He told us in the winter of 1860 that the preceding year he had lost less than ten out of more than five thousand. Sheep need a little extra care, even in Texas, during cold storms and northers. A thick growth of timber, especially cedar, affords a good shelter from the cold winds.

Beginners should take especial pains to obtain hardy, healthy sheep, and select a locality on which there is either a never-failing spring or stream of water, in grassy plains bordered by woodland. They should also look along the borders of streams and in the valleys for the burweeds (Xanthium) and other weeds, whose burs, when in the fleece, injure its sale. As the Texas wool grower is not subjected to the expense of building costly shelters, or the providing of hay and feed for his flocks during six or more months of the year, he can well afford to eradicate from his lands those weeds which injure his wool. Let all such be cut down or pulled up when in bloom, much of which can be done by the shepherd while he is with the flock. It will not pay to send dirt and burs in wool to New York. Better pay less freight on a less quantity of clean wool and obtain a higher price. In the New York market June 6th, 1866, Texas wool is quoted at from 15 to 25 cents currency per pound, while the Northern coarse wools are selling at from 45 to 50 cents, and full blood merinoes at from 60 to 65 cents, and choice lots from Ohio and Pennsylvania from 70 to 72 cents. Why is there this great difference between the price of Texas wool and Northern wool? It is simply in the condition of the fleece, and it is for the interest of all our wool growers to apply the proper remedies as soon as possible. We are glad to see that many of our large wool growers are awake to the importance of the subject and discussing the matter in our public journals. The country has long been humbugged, especially at the North more than in Texas, by heavy shearing greasy merino sheep. To illustrate, which we quote from notes of the Country Gentleman, on the Rochester (New York) sheep show, which took place recently, and where there was the largest display of merino sheep ever held in the country:

"Why, sir, there are single sheep on the ground worth $10,000. This can be easily shown. Here is a buck that sheared 26 pounds 9¼ ounces of wool, and he is by no means the best sheep on the grounds, as he did not get the prize. Now, sir, your reporter keeps a flock of merino sheep that averaged last year only 5 pounds of wool. Suppose by purchasing such a ram he could bring up the average to 15 pounds, how much would such a ram be worth to him? His present flock probably costs him the increase, and three pounds of wool to pay expenses, leaving only two pounds of wool as profit. But if it was 15 pounds and the expenses were the same as before, the *profits* would be 12 pounds of wool, or just *six times* as great as at present. I can keep 500 sheep on my farm, and the profits, as we have estimated, would be 1,000 pounds of wool in the one case and 6,000 pounds in the other; or reckoning wool at 50 cents a pound, the profits with my present flock would be $500, and with the 'improved American merinoes' it would be $3,000. But this is not all. I could rear rams of my own that would be worth thousands and tens of thousands of dollars, and I should soon be a rich man. Hadn't I better mortgage my farm and buy a ram? Full of this idea I go to a moneyed man who happens to be a woolen manufacturer, and ask him to loan me $10,000 on real estate security, telling him I want it at once to buy a sheep, and that I must be in a hurry before they are all sold! These capitalists are a provoking class of men. Instead of letting me have the money at once, and thus enabling me to make my fortune, he commenced a tirade against the sheep. 'These sheep,' said he, 'will ruin the wool-growing interest of this country. You say you saw one of the fleeces that weighed 26 pounds 9¼ ounces. How much wool do you suppose there is in that fleece?' It was very clean, I said. The sheep has been housed all winter and blanketed all summer, so that there can be little dirt in the wool. 'Perhaps not much dirt but lots of grease.'

Oh yes, I have heard of 'Cornwall finish,' and I presume there have been cases where the sheep have been smeared with grease to make the wool heavier, but I am satisfied Mr. Blank is an honest man."

"Well, perhaps so, but he has got the grease there nevertheless. He may not have smeared the sheep, but I tell you what he has done. He has bred his sheep in such a way that they secrete large quantities of yolk or grease in the wool. He is careful not to let even the dew get on them, lest it should wash out a little of it. It is all in the wool, and I will guarantee that the fleece which you saw weigh 26 pounds does not contain over 6 pounds of pure wool! You go and ask him how much scoured wool his sheep shear?"

I did not see Mr. Blank, but meeting a well known Vermont breeder, he said one of his rams last year sheared 23½ pounds. He was careful not to say "of wool." "He sheared 23½ pounds, but how much poor wool did he shear?" "That, sir," he replied, "is a question we never answer." A friend, however, told me that that very fleece was scoured and cleansed only 3½ pounds. In other words the fleece contained 3½ pounds of wool and 20 pounds of worthless matter. After talking this matter over with my friend, I concluded not to mortgage my farm. He says this 20 pounds of grease is not only worthless, but that it costs a good deal to produce it, and that he would rather have the grease on the kidneys. Is this true? Have these breeders of improved American merinoes devoted their time, intelligence and skill to obtain a class of sheep that secrete fat among the wool rather than in the carcass? Is this the improvement? They say the wool is not remarkably fine—not fine enough for making the best cashmeres, and that we have to import several millions of dollars every year.

Mr. Clapp's "American merino" ewe that took the first prize at the Canandaig uatrial last year for the greatest quantity of scoured wool, in proportion to live weight, was again sheared and gave 10 pounds 3 ounces of wool. Her weight, after removal of the fleece, was 57 pounds. Last year, when two years old, she weighed 49 pounds, and sheared 9.85 pounds of wool. Last year Mr. Gazley's Cotswold, weighing 99½ pounds, sheared 8.9 pounds of wool. This year he sheared one, weighing 100 pounds, that gave 10¾ pounds of wool. He also sheared a Cotswold ram that weighed 125 pounds, and gave 11 pounds 10 ounces of wool.

Last year, at the Canandiagua, N. Y., trial, the fourteen Merino sheep sheared gave 176¾ lbs. of wool, and after cleansing, 64½ lbs., or 36 per cent. of scoured wool. The Cotswold fleece, on the other hand, contained 82 per cent. of scoured wool In other words, 100 lbs. of Cotswold fleece contains as much pure wool as 227 lbs. of American Merino wool, and that from sheep selected for the trial."

The above is from the pen of one who has a flock of Merinos, published in one of the leading agricultural papers of the country, and its facts will enable the Texas wool grower to value rightly those heavy shearing Merino sheep, some of which will probably ere long be brought here for sale. The writer, in 1860, saw Merino sheep in some Texas flocks recently bought from a Northern drove at from one hundred to three hundred dollars each, which would not be valued at more than five dollars a head in their native country. If we must give these high prices, it were better to give them some well known wool grower of our own State. Recent improvements in machinery, by which the manufacturer is enabled to make superior long wooled fabrics, now much in vogue in the winter season, has increased the demand for, and the price of, long wool. In the Boston market in 1865, Cotswold wool during the season was about ten cents a pound higher than Michigan Merino. The demand for this kind of wool is now greater than the home production. At a meeting of the leading wool buyers in Cleveland, Ohio, the last week in May, the following resolutions were passed:

WHEREAS, The wool crop of Ohio is fast increasing, and will probably reach 30,000,000 pounds the present year, and being one of the most important and profitable productions of the State, merits the careful attention of buyers; and

WHEREAS, In former years the clip of our State has ranked superior to that of other States; and

WHEREAS, For several years past the wools of the State have lost their high reputation, in consequence of the careless and dishonest manner of working and handling—this is not intended to apply to all growers, as there are many honorable exceptions—therefore,

Resolved, That in view of the many just causes of complaint from manufacturers and dealers, that our wool is greatly degenerating in condition, we recommend to the growers that they thoroughly tag and wash their sheep, tub-washing the tags and keeping them separate from the fleece; and not allow the sheep, after washing, to run more than from six to ten days before shearing; to tie up the wool with smooth, light-colored twine, not exceeding twice each way, and in all respects to have it as free from foreign substances as possible, and every way in good condition. We confidently say that with proper attention to these reasonable recommendations, the standard of our wool will regain its former reputation, and be enhanced in value. Manufacturers will hereafter select only wool in good condition, and will avoid greasy, dirty fleeces.

Resolved, That the members of this convention recommend to all dealers and buyers that they neither purchase themselves, nor allow their agents to purchase wool, excepting on the following conditions:

1. A deduction of one-half on all unwashed buck fleeces.
2. A deduction of one-third on all washed buck fleeces.
3. A deduction of one-third on all other unwashed fleeces.
4. That all heavy, unconditioned and badly cotted or stuffed fleeces shall be classed as unwashed.
5. A deduction on all wool tied with an unnecessary amount of twine.
6. The prosecution under the law for fraud for any attempt to misrepresent or to deceive as to the inside condition of the fleeces, in reference to tags, measure, dead wool, or any foreign snbstance.
7. To pay the outside limit of the market for all wool in good condition, this being but a matter of justice to those growers who put up their wool honestly.

We give place to these resolutions, because they show how things are done, or are required to be done, in one of the leading wool States. Let there be a union among our wool growers, and let them only send their wool in good condition to market, and all such will receive increased prices, while those who continue to put up their wool in a dirty, bad condition, will soon find little or no sale for their fleeces. One thing is very certain, these last will receive far less profits than the former.

Let not any one suppose we intend to disparage Merino sheep, far from it; we only caution the people against buying at high prices heavy shearers of that class of sheep which may be brought here from the North. Wool growing in Texas may be rendered very profitable, either with the Merino, or the Cotswold, or other long-wooled sheep.

The area of the State is estimated at 175,594,560 acres, of which only 2,758,443 acres are improved, according to the census of 1860, and 20,486,990 are reported in addition as unimproved. We presume this includes all on which taxes were then paid. It is probable that nearly 100,000,000 acres of Texas lands remain unsold, most of which is in the western and northwestern part of the State, and capable of sustaining many more sheep than are now in the entire United States; and we predict that it will yet be done, and if done rightly Northern wool growers cannot compete with us. As one acre of grass is sufficient to keep from three to five sheep, it will be seen that our estimate is not overdrawn—besides giving ample room for large herds of cattle and horses.

In some of the old settled counties too little attention is given to the preservation of the native grasses. By overstocking and feeding so close that the grasses are not permitted to ripen seeds, many of the annual and biennial grasses of some sections are exterminated and useless weeds growing instead. This should not be; and as the acres growing weeds are not yet very many, it is not too late, and still comparatively easy, to apply the proper remedies, which are to sow grass seed in the fall on places occupied by weeds, or bare of grass, and also for the owners of the land to enclose their grass lands and reap the full benefit of their own property. Wherever this has been done, and such instances are not uncommon, the owners of these pasture fields are highly satisfied with the result. They know where to find their stock, which often has good pasturage when other cattle, sheep or horses are suffering for want of food on oversrocked, unfenced prairies. In these enclosed pastures some spots of grass rarely fail to ripen seeds, and the grass continues to cover the ground. In the stock region of the western parts of the State, it is not practicable to fence the larger portion of the prairie lands, and there are many who own only 15 or 20 acres, who have large herds of cattle or droves of sheep. It is probable that the time is not distant when these grazing lands will be owned by stock men, and defined by suitable boundaries, and shepherds or herdsmen, employed to keep the stock within the proper range, or else large tracts be bought by companies, and each shareholder be allowed to keep his proportion of stock. We may rest assured that the cheapness of keeping stock in Western Texas will not permit the lands in that section to remain much longer as State property. Fortunately some of the best grasses of

Western Texas are diœcious, that is they have fertile and barren flowers on different plants; the seeds being at or near the roots of the fertile plant. Others are propagated extensively by runners, often seeming to thrive best on side hills and poor dry soils.

There are about 250 species of grass growing in the States east of the Mississippi river. We are sure that Texas has more species than any one State, and certainly not less than two hundred species, for we have many which are not found in the old States. Now many of the old cotton States are almost entirely destitute of good native grasses, simply because they neglected to preserve them.

Dr. Lincecum has tested and cultivated on his farm, at Long Point, in Washington county, about 50 species of native grasses, specimens of which he has presented to the State collection, accompanying which was the following letter:

"From No. 1 to 17 is a duplicate suit of grasses indigenous to Texas, which I contributed to the State Cabinet several years ago. I understand, by letter from Prof. S. B. Buckley, that my first set of grass specimens have all been destroyed.

"Herewith I contribute to the State Cabinet a new suit, with 29 additional species of Texas grasses. These are all good nutritious grasses, very suitable for a mixed grazing pasture for both winter and summer use. Quite a number of them are very fine spring grasses which, with a little attention, flourish finely, and are sightly and most excellent for hay. The common broom straw, curly sedge and some other prairie species, are not included in this collection. Should it be necessary, I can obtain them from my meadow next summer. This meadow is stocked with all the original Texas grasses, and in the months of April, May and June, it is a good place to visit, to renew the recollection of how Texas prairies looked 30 years ago. In it are to be found all the kinds of the rich, luscious, wavy grasses, and highly painted, nodding flowers that fed the flocks of deer, antelope, and vast herds of buffalo, and freighted the balmy south wind with sweet fragrance ten thousand years previous to the time the polluted tramp of unholy civilization had defiled these once beautiful plains. The meadow contains 35 acres, and to those whose tastes lead them to examine unadulterated nature it is a pleasant place, when it is blooming and casting its fragrant odors upon the air for a mental feast.

"Any one who will take the pains to enclose a plat of outlands, and to keep the stock from it three years, will find himself the owner of a similar meadow.

GIDEON LINCECUM."

In 1860 he published an account of some of these in the Southern Cultivator, which then excited considerable attention, and many Southern planters wrote to the Doctor for a supply of grass seeds, but the war which came stopped the correspondence.

Eastern Texas is well timbered, having about fourteen different species of oak, three species of pine, the same number of elm, four of maple, six kinds of hickory, including the pecan, the cotton wood, (Populas augulata,) sycamore, (Platanus Americana,) two species of gum, (Nyssa,) three species of magnolia, two of cedar, (Juniperus,) Bois d'arc, (Maclura,) and many others, some of which extend no farther North than this State. The south-eastern portion of this region, lying on the rivers Angelina, Neches and Sabine, contains the finest timber and pinery in the United States. There is nothing equal to it in the States east of the Mississippi river, either for the size and beauty of its trees or its extent, which is nearly 100 miles square, extending from the lower edge of Nacogdoches to the coast, and from the Trinity river to the eastern part of the State, a large portion of which is covered with pines, of which the principal species is the long-leaved pine, (Pinus palustris,) with a comparatively few trees of the short-leaved pine, (Pinus mitis,) and the loblolly (Pinus taeda.) The swamps of this region also have some magnificent large old cypress trees (Taxodium distichum.)

In the summer of 1861, we saw a large raft of cypress timber in the river at Orange, whose logs were sixty feet long, and none of them had a diameter of less than four feet at the top. Many of the long-leaved pines in the counties of Jasper, Tyler and Hardin are about four feet in diameter, at three feet from the ground, and upwards of one hundred feet high. This is a greater size than this species of pine usually attains, and such trees grow there by thousands. They are good, not only for common lumber, but for masts for the largest ships. A few years ago such trees could have been sold for that purpose at prices ranging from fifty to one hundred and fifty dollars each, delivered on the coast. A friend of ours, living on the Alabama river, obtained such prices from the French Government in 1858. He bought his pines of the planters at about five dollars each, and floated them down the river to Mobile, which was the point of delivery. The lumber of the long-leaved pine is better than any other species of pine for either ships or houses, and therefore brings a higher price than in the markets of the Northern cities of the United States or those of Europe. The swamps on the lower part of the Red river, and through portions of lower Louisiana, west of the Mississippi river, have prevented good roads from being made; hence this portion of Texas has been neglected and passed around by emigrants, who have generally entered Texas by the Northern route through Alexandria or Shreveport, or else gone by the Gulf route through Galveston. On this account this pinery is little known, especially by lumbermen, or by those persons engaged in the turpentine business. Not only does the long-leaved pine afford a superior lumber, but it yields one-third more pitch than any other American species of pine. The lumber of this region can be floated at high water down the Neches, Sabine and other rivers, either to Sabine Pass or other places on the Gulf of Mexico, and there be shipped. We predict that large fortunes will soon be made in this lumber section, for enterprizing men both North and South are now on the lookout for opportunities to make money. Large cypress trees are frequent on some of the streams of Hays, Comal, Blanco and Gillespie counties, where we measured several which were over six feet in diameter. In this region, which has no pines, these trees are very valuable, either for furniture or building purposes.

The liveoak (Quercus vircus) is another valuable tree common in many parts of the State, extending its range from the coast, through Central Texas northward to the Red river. Just below Richmond, on the Brazos river, large liveoaks occur, many of which are from five to six feet in diameter, with spreading branches. They continue to be numerous on all uncleared lands south-eastward to the coast. Through the Central portion of the State we often see them from two to three feet in diameter. We inquired last year at the navy yards both of Washington, and Cambridge, Massachusetts, and was told that there was no difference, or they knew of none between the Texas and Florida liveoaks. Surely those who supply our navy yards with this valuable lumber do not know the size and extent of country overspread by the liveoaks of this State.

Besides the preceding, the uses of which are well known, we have many ornamental trees and shrubs, some of which are peculiar to the State, or not found north of the Sabine. From these enough can be selected for all needful ornamental purposes. They are not only superior to most foreign things of the kind, but also better adapted to the climate and soil of the country. We give the names of some:

Magnolia grandiflora, or Large flowering Magnolia. This fine evergreen tree is more easily cultivated than many suppose, and is easily grown from the seed. It is common about Houston and throughout South-eastern Texas. It is grown in the open air as far North as Washington, D. C. Last summer, at Mount Vernon, we measured a beautiful magnolia which was more than 4 feet in circumference at three feet from the ground, which is said to have been planted by Washington, who was very fond of gardening and trees.

The Magnolia glanca, or Sweet Bay, grows on the banks of streams and in swamps in Eastern Texas. It has sweet scented flowers, and can be grown on uplands, and is hardy as far North as New York.

The "Retama" (Parkinsonia aculeata) grows wild in many parts of South-western Texas, and is now common in cultivation at Austin and in other places. The young trees have a bright, green, smooth bark, both on their trunks and branches; long pendant grass-like leaves with small leaflets. It has bright, yellow, pea-like fragrant flowers, the lower parts of the petals tinged with ocreous brown. It is in flower from May to September, having at midsummer blossoms mingled with its long slender pods It is a rapid grower, and quite hardy. From its endurance of the northers at Austin, where the thermometer is sometimes as low as 20°, and occasionally 12° below the freezing point, it can probably be cultivated in the open air as far North as Washington, D. C. It deserves extensive cultivation in all the States south of that latitude, for there are few trees more beautiful. We have another small tree of the same tribe of plants growing on the limestone hills in the neighborhood of Austin and New Braunfels. It is an evergreen Sophora, having the specific name of speciosa on account of its beauty. It has leaves somewhat similar to those of the common Locust, (Robinica,) and racemose fragrant flowers, resembling those of the common Wistaria. It has scarlet bean-like seeds in thick pods. As this is an evergreen of deep green foliage, very fragrant flowers, and pretty fruit, it is still more ornamental than the Parkinsonia. Being found on the highest hills, it will probably endure a greater degree of cold than the Parkinsonia, and succeed well in the climate of Philadelphia. The cold northers of the latter part of the year 1859, when the thermometer in several places was as low as 6°, killed a great many of the peach trees throughout Texas, but the beautiful Sophora remained uninjured. There is another Sophora (affinis) here which is also a small tree. It is quite common in Central and Western Texas, has deciduous leaves, very much like those of the common Locust, and has about the same grade of beauty. Neither of these Sophoras have been much cultivated.

The Caesalpina pulcherima, or the most beautiful Caesalpina, is well worthy of its name. It has large, reddish, yellow honeysuckle-like flowers, and small mimosa-like leaves. It is cultivated at Austin, having been brought from Mexico. It also grows in North-western Texas, and will probably do well in the open air without protection in most of the States south of Washington.

The Mesquite (Algerobia glandulosa) is very common in most of Central and Western Texas. It is a low spreading tree with rough bark and branches armed with thorns. It has light-green leaves—pinnatifed—which are large and pendant often from the branches. It is frequently scattered over the prairies of Central and Western Texas, where its foliage, in contrast with other trees, gives an agreeable feature to the landscape. It has mimosa-like yellow flowers, and seeds in long pods, and, like the Retama, is sometimes in bloom from spring to autumn. A gum exudes from its branches which is very similar to gum arabic in its properties.

The Chilopsis lineata has recently been introduced into cultivation at Austin from Western Texas. It has willow-shaped leaves, and Bignonia-like flowers, which are strongly tinged with purple, and sweet-scented like the perfume of rose water. It flowers from May to August, is a small tree, has a scanty foliage and deciduous leaves, is a rapid grower, and delights in a dry climate and limestone soil. Amorpha fruticosa and Amorpha Texana are on the banks of our streams.

The latter is an evergreen species with large leaflets growing on the Perdinales to the height of from four to five feet. Our numerous species of Acacia and Mimosa are all ornamental. One is highly so—the Acacia Sabeana, growing on the banks of the San Saba river, in Mason county. It is a large shrub with large leaves, and numerous bright yellow flowers which are globular and about an inch in diameter.

The Arbutus Texana is a rare tree, with small lanceolate evergreen leaves, with white cup-shaped flowers, and bright scarlet berries which hang on the branches until winter. Its trunk and branches have a smooth chesnut colored bark. It grows on the limestone hills northwest of Austin, and also on the road between Austin and Fredericksburg, about 40 miles distant from the former place. It is a small tree about a foot in diameter and from 15 to 25 feet high. There are few trees more ornamental than this, with its bright green leaves smooth reddish-brown bark and scarlet berries.

One of the most common Elms throughout the State is the Ulmus Crassifolia, or the dense-leafed Elm. It has long slender branches, thickly set with twigs and leaves, forming a dense shade. It leaves are of a deep green, and smaller than those of the common elm, U. Americana. It differs from the other elms in its time of flowering, which is here in August. It is quite a large tree, being often two or more feet in diameter and from fifty to sixty feet high. It grows in the most northern parts of this State, in the Indian territory, also in Arkansas, and will probably prove to be perfectly hardy in most of the Northern States. To us it seems more deserving of cultivation than any other speciies of its genus.

There is an evergreen Sumac (Rhus vireus,) growing on the hills about Austin, which does not seem to have the poisonous properties peculiar to some of its genus. It has small clusters of bright red berries, and glossy deep green leaves. It is a large shrub or small tree. We have three or four species of the Holly tribe (Ilex,) viz: I. opaca, decidua, and cassina, all of which are ornamental, especially when loaded with red berries. I. cassina is the celebrated Youpon of the Carolinas, a decoction of whose berries formed the "black drink" used by the Creek Indians in their councils.

The Mate or Paraguay tea, in general use throughout Brazil and other South American countries, is the Ilex Paraguayensis, and is not indigenous in North America. A malvaceous shrub growing on the hills about Austin, is, when in flower, very beautiful. It is the Pavonia lasiopetala, and has lately been introduced into cultivation. The Spanish horse chesnut (Ugnardia speciosa,) has small red pea-like blossoms, and fruit similar to the horse chesnut (Aesculus.) It flowers about the first of April, and is common on limestone cliffs in Central and Western Texas. There are several species of Spanish dagger (Yucca,) a few of which are already in cultivation. And of Cacti there are a great many species, most of which are very handsome when in flower, and a few of them are very pretty in fruit. The different species of wild flowers growing on the prairies of Texas are much more numerous than those found on the Northwestern prairies, and many of them are as splendid and fragrant as the choicest flowers in cultivation. We have merely glanced at the botanical wealth of Texas, which, if properly used with a sprinkling of the foreign things in common cultivation, is amply sufficient to ornament and render pleasant the grounds of our people, both in town and country. Who would not rather see a cheap little cottage amid trees, fruits, shrubs, and flowers, than a palatial mansion without them?

Yes, a neat little cottage embowered among vines and shrubbery, with a good library of books, has many of the elements of true happiness. Let all strive to make home pleasant, so that its inmates may prefer it before every other place, then the children will be apt to form good habits and be a blessing to their country and their parents. Nothing will more tend to this result than beautiful rural homes, which can easily be made throughout a large portion of Texas.

APPENDIX.

DESCRIPTION OF NEW TEXAS GRASSES.

SCHLEROPELTA N. GENUS.

Spikes 3-4 flowered, solitary ; glumes deeply 3-5 cleft, rigid, at the base shortly pilose, middle segment obtuse or shortly mucronate, 5-nerved, lateral segments subulate, or at their tops aristate ; arista rigid ; lateral flowers staminate; central pistilate; style elongate ; stigmas 2, plumose exsert, ovary compressed, ovate, smooth ; palea subequal, hyaline, smooth, sharp pointed.

Schleropelta stolonifera (n. s.) Stems erect 4-8 inches high, slender and numerous, stoloniferous, joints pilose, internodes smooth ; sheaths smooth or sparingly ciliate, shorter than the internodes, the margin above sometimes membranaceous; ligula membranaceous, elongate, at the top a little laciniate, 2-4 inches long and 1-2 lines broad ; panicle spike-like ; spiklets few, about an inch long, obovate alternate, closely pressed together, sessile erect ; rachis scabrons and bent at the insertion of the spikelets; palea a little longer than the glumes.

North-western Texas ; where it is one of the many grasses called "Mesquite." In foliage, size and excellence for pasturage it resembles the "Buffalo grass," which is also called "Mesquite" in Texas

Pappophorum (Polyrhaphis) vaginatum (n. s.) Stem erect, terete, rigid, smooth ; sheaths smooth, pilose at the mouth, longer than the internodes ; ligula hairy ; leaves flat or convolute, erect, somewhat rigid, 6-8 inches long, 2-3 lines broad, the upper ones extending beyond the panicles ; panicles 2-4 inches long, 2-3 lines broad, spiked, densely flowered, sheathed at the base ; spikelets 2-3 shortly pedicellate ; rachis and pedicles rough glumes a little unequal 1-nerved, ovate, acute, subhyaline, longer than the florets, midrib slightly scabrous ; lower palea 12-14 aristate smooth ; awns unequal, scabrous, about equal in length to the paleae or a little longer.

Western Texas. Roots fibrous; culms growing in tufts $1\frac{1}{2}$-2 feet high, and almost entirely covered by the sheaths and leaves.

Cenchrus setoides (s. n.) Culms decumbent, terete, smooth, 1-$1\frac{1}{4}$ feet long; sheaths smooth, about equal to the internodes or exceeding them in length; ligula shortly setose; leaves longer than the culm, smooth plane, 5-8 inches long, 2-3 lines broad; spikes terminal, composite, subcylindrical, 3-4 inches long, 4-6 lines broad, involucellate 1-flowered; setae subfasciculate, unequal, rigid, a little longer than the spike; glumes smooth unequal lower one 1-nerved and $\frac{1}{2}$ shorter than the upper one; upper one 7-nerved and about equal in length to the florets.

Prairies Northern Texas. Its densely flowered spikes causes it to resemble a setaria, but its rigid dilated at the base and disposed in 2-3 series show it to be a true Cenchrus. Fruit caducous and adherent.

Calamagrostis (Deyeuxia) longirostris (s. n.) Culm erect, a little scabrous, half foot high, sheaths a little scabrous, and about equal to the internodes; ligula elongate, membranaceous and subentire; leaves plane or convotate scabrous, shortly pubescent above, 4-6 inches long and 2-3 lines broad; panicle termenal, somewhat open and interrupted 3-5 inches long and 8-12 lines broad; rachis terete pubescent; glumes subequal, lanceotate, acute, longer than the florets, scabrous upon the back, margins and apex hyaline; upper 1-3 nerved, lower palea 3-5 nerved, shortly pilose at the base, hyaline upon the margin, apex bifid, below the middle long aristate; awns twisted, jointed, and double the length of the florets; lower internodes of the rachis about 8 lines in length; upper intervals 2-3 lines long; longest rays naked near their bases and densely spiked near their summits; spikelets about 3 lines long.

Panicum (Tridachne) saccharatum (n. s.) Culms geniculate, erect, terete, ciliate at the joints; ligula membranaceous, laciniate, leaves 4-6 inches long, 2-3 lines broad; panicle terminal spreading, 3-4 inches long; rachis scabrous, ciliate, angular, rays in pairs, scabrous and ciliate; lower glume minute ovate; upper one lanceolate, acute, longer than the floret, 3-5 nerved and densely pubescent.

Middle Texas. Common in open post-oak woods. It resembles an Andropogen; florets enveloped in woolly hairs; rays 3-4 inches long, erect and coarctate until the seeds are nearly ripe when they diverge, soon after which the seeds ripen and fall.

Panicum glomeratum (s. n.) Culm erect 2-3 feet high, smooth; lower theaths pubescent, the upper smooth; ligula, shortly pilose or membranaceous and laciniated, leaves plane, a little pubescent when poung, finaly glabrous, 4-8 inches long and 2-3 lines broad; panicle elongate, interrupted; rachis angulara, little scabrous on the margins; rays solitary, erect, adpressed, about an inch long, dense flowered, the lower ones most distant; lower glume suborbiculate 3 nerved 1-2 a 2-3 shorter than the florets; upper glume 5 nerved subacute, about equal to the florets.

Western Texas. Resembles a Paspalum; rays densely flowered from bottom to top; florets smooth and somewhat distichous, sessile, ovate, and rather obtuse; internodes of the rachis 1-3 inches distant.

Panicum Texanum (n. s.) Culms erect or subdecumbent, terets, smooth; sheaths shorter than the internodes, subprobescent and at their mouths hairy; upper portion of the internodes and joints prubescent; leaves 6-10 inches long and 8-10 lines broad, long accuminate, under surface subpubescent; panicle compressed, 5-8 inches long and 5-7 lines broad; rays alternate erect, lower glume ovate, acute, ½ shorter than the floret, five-nerved; upper one seven-nerved, acute, hyaline, between the nerves subpubescent, longer than and covering the floret. Several stems often grow from the same root, stems sparingly branched, seeds numerous and aggregated.

Austin, Texas; where it is often cut for hay. It is said to be relished by both horses and cattle. It grows thick and affords a large yield per acre. We think it will prove a valuable grass to the South.

Panicum repente (s. n.) Culms long, trailing, flower-bearing branches erect, jointed, smooth, 6-12 inches long; sheaths smooth, sparingly ciliate at their mouths or naked; ligula membranaceous, shortly truncate; leaves smooth, glaucous, 4-6 inches long, 2-3 lines broad; panicle terminal, rigid, and but little branched; 3-4 inches long; rays solitary, rigid angular, a little scabrous; spikelets subovate, two-flowered shortly pedicellate; lower glume ovate obtuse five-nerved; a little shorter than the flower; upper one seven-nerved, obtuse, broad ovate, about equal to the flower. Runners 2-3 feet long; sometimes with flower stems at the root-bearing nodes and also at the primitive roots.

Panicum ciliatissimum (s. n.) Culm erect or decumbent at the base, smooth, pilose at the joints; sheaths ciliate about equal to the internodes ligula shortly pilose; panicle terminal, open, 1½-3 inches long and 4-6 lines broad; leaves few and shortly ciliate, 2-3 inches long and 2-3 lines broad, margins hyaline and scabrous; rays 2-3 paired angular scabrous, adpressed ½-1 inch long; spikelets ovate acute shortly pedicellate; pediceals angular scabrous, 2-3 lines long; lower glume ovate acute 5-6 nerved, about equal in length to the floret, its nerves and margins densely ciliate. Northern Texas, grows in tufts 1-1½ feet high. Cilia of the sheaths thick and erect; hairs of the glumes dense and cottony.

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